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STRAITS SETTLEMENTS

Vol. VIII 24th June, 1935 Part 3

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CORRIGENDA.

The Ferns of Mount Kinabalu, Gardens' Bulletin, S. S., Vol. VII, part 3, June 1934.

p. 195, line 9, for "beyond Marei Parei, alt. 5000 ft." read "in the Silau Basin, altitude about 6000 ft."

p. 214, line 35, for *serrulatum* read *serratulum.*

p. 215, line 7, for *serrulatum* read *serratulum.*

p. 324 (index), for *Trichomanes serrulatum* read *serratulum.*

Notes on the Biology of Macaranga spp., Gardens' Bulletin, S. S., Vol. VIII, part 1, October 1934.

p. 63, line 22, for "specimens" read "species".

p. 63, line 36, for "indurated to accommodate" read, "too indurated to accommodate".

p. 64, line 20, for *"(Plate XV, figs. 2, 3)"* read "(Plate XIV, figs. 5 and 6)".

THE

GARDENS' BULLETIN

STRAITS SETTLEMENTS

Vol. VIII 24th June, 1935 Part 3

TWO COLLECTIONS OF ORCHIDS FROM BRITISH NORTH BORNEO, PART I

by C. E. Carr

EDITORIAL NOTE

This paper is the first of a proposed series on the collections of orchids made on Mount Kinabalu by Chaplain Joseph Clemens in 1931-1933 and by Mr. C. E. Carr in 1933. Mr. Carr's collections were made for the Botanic Gardens, Singapore, and the numbers cited are in the series of Singapore Field Numbers (SFN) which are used for all collections now distributed from the Singapore herbarium. Mr. Carr quotes also his own numbers, which are prefixed with the letter C. By arrangement with the Keeper of Botany, British Museum (Natural History), to whom due acknowledgement is made, Mr. Carr was enabled to study the Clemens collections together with his own, thus making the present record as complete as possible. The number of species involved is so large that it has been found desirable to publish the enumeration in a series of papers. The present paper covers the Apostasiaceæ and Orchidaceæ up to the genus *Arundina*.

In all, 137 species are enumerated, belonging to 40 genera. Of these, 39 species are described as new, and a further 41 are new to the flora of British North Borneo. One new genus, *Neoclemensia*, is described. The genus *Chelonistele* is re-described, and a key to the species is given. A new section *Eurybrachion* of the genus *Dendrochilum* is described, with a key to the species; this section appears to be confined to Borneo. At the end of the paper is an index in which new species and new combinations are indicated in distinctive type.

The great wealth of the orchid flora of Mount Kinabalu is well shown by the fact that in six months Mr. Carr collected flowering specimens of approximately 700 species,

and this in spite of the fact that in the neighbourhood of Mt. Kinabalu there is hardly any lowland forest, which might be expected to have characteristic species not occurring on the mountain. It should be noted however that a number of species typical of lowland country in the Malay Peninsula were found at altitudes of well over 1,000 feet on Mt. Kinabalu. Thus *Dendrobium pandaneti* Ridl, in the Malay Peninsula confined to coastal rivers and rice fields, was twice found at above 1,000 feet altitude on Kinabalu.

Owing to Mr. Carr's very intimate knowledge of this family of plants and his exceptional ability as a collector, this collection is probably one of the most complete ever made in any comparable area in the Malayan region, and its record is therefore of exceptional interest.

APOSTASIACEÆ

Neuwiedia Lindleyi Rolfe in Journ. Linn. Soc. Bot. XXV (1889), 232, t. 48, f. 10-12.

C. 3387, SFN 27823, Dallas c. 4,000 feet, May, 1933.

Distribution:—Sumatra, Malay Peninsula.

Apostasia odorata Bl. Bijdr. 423, t. 1, f. 5, etc.

Penibukan ridge c. 3,500 feet, March, 1933.

Clemens s.n. Kamborangah 8,000 feet, March 24th, 1932.

Clemens 26883, Dallas 3,000 feet, October 31st, 1931: 27696, Dallas 3,000 feet, December 30th, 1931.

Distribution:—Java.

ORCHIDACEÆ

Paphiopedilum javanicum Pfitz. in Engl. Bot. Jahrb. xix (1894), 40. etc.

C. 3163, SFN 26637, Menetendok, c. 3,000 feet, March, 1933.

Clemens 27618, Dallas-Tenompok ridge 4,000 feet, December 15th, 1931: 28716, jungle East of Tenompok camp 5,000 feet, March 8th, 1932.

Distribution:—Sumatra, Java.

Paphiopedilum Dayanum Pfitz. in Engl. Bot. Jahrb. XIX (1894), 40. etc.

C. 3036, SFN 26312, Penibukan ridge c. 3,500 feet, March, 1933.

Distribution:—Endemic.

Platanthera angustata Lndl. Gen. & Sp. Orch. 290. etc.

C. 3515, SFN 27521, Kamborangah, c. 7,200 feet, June, 1933.

Distribution:—Java, Sumatra, Malay Peninsula.

Platanthera kinabaluensis Krzl. ex Rolfe in Journ. Linn. Soc. Bot. XLII (1914), 160: *P. Gibbsiae* Rolfe l.c.

C. 3523, SFN 27533, below Paka Paka, terrestrial in thin scrub c. 9,000-10,500 feet, June, 1933.

Clemens 29782, Tenompok 5,000 feet, May 27th, 1932.

Sepals and petals green to bright yellow-green. Lip yellow-green with paler margins, spur pale green or pale yellow-green.

I strongly suspect that *P. crassinervia* A. & S. and *P. borneensis* Ridl. represent other forms of this variable plant. The plant is locally common on the main spur from 9,000 to fully 10,500 feet altitude and I made a large collection. A plant very closely fitting the description of *P. crassinervia* A. & S. was found by me near camp at Paka Paka.

Distribution:—Endemic.

Platanthera Stapfii Krzl. ex Rolfe in Journ. Linn. Soc. Bot. XLII (1914), 160.

C. 3126, SFN 26560, Marei Parei spur, terrestrial in the open c. 5,000 feet, March, 1933. *Flowers bright green.*

Distribution:—Endemic.

Platanthera saprophytica J. J. S. in Bull. Inst. allgem. Bot. Hamb. VII (1927), 12, t. 1, f. 2.

C. 3114, SFN 26511, terrestrial in tall forest above the Mahandui river on Penibukan Ridge c. 3,500 feet, March, 1933.

Distribution:—Endemic.

Peristylus candidus J. J. S. in Fl. Buit. VI. Orch. (1905) 36, Atlas f. 18.

C. 3320, SFN 27811, a common terrestrial plant in the neighbourhood of Bundu Tuhan c. 3,000 feet, April, 1933.

Distribution:—Sumatra, Malay Peninsula, Java, Celebes, Amboina and Boeroe.

Peristylus brevicalcar sp. nov. Caulis erectus, pervalidus, vaginis arcte tubulosis omnino tectus. Folia apicalia c. 5, late lanceolata, acuminata, acutissima. Inflorescentia brevis, densiflora, pedunculo brevi vaginis c. 3 obsesso. Bracteæ lanceolatæ, acuminatæ, acutissimæ. Sepalum dorsale oblongo-lanceolatum, obtusum, conico-apiculatum. Sepala lateralia elliptico-lanceolata, obtusa acute apiculata. Petala late ovata, abrupte acuminata, obtusa. Labellum 3-lobum, calcaratum, lamina oblonga,

lobis lateralibus anguste triangularibus obtusis quam lobo intermedio triangulari obtuso brevioribus, calcare breviter late ovoideo.

Stem erect, rather stout, covered with loosely tubular sheaths with funnel-shaped apex the upper ones with the apex long free lanceolate acute, c. 14 cm. long. *Leaves* apical c. 5, erecto-patent or spreading, broadly lanceolate, acuminate, very acute, up to c. 8 cm. long, c. 2.50 cm. wide, sheaths tubular c. 1.50 cm. long. *Inflorescence* short, densely many-flowered, peduncle provided with c. 3 large spreading sheaths c. 3.50 cm. long, rachis c. 4 cm. long. *Bracts* lanceolate, subulate-acuminate, very acute, c. 1.40 cm. long, c. .45 cm. wide. *Flowers* hardly expanded with white sepals and pale yellow petals. *Dorsal sepal* oblong-lanceolate, obtuse, conic-apiculate, 1-nerved, margins minutely ciliolate, c. .58 cm. long, c. .27 cm. wide. *Lateral sepals* elliptic-lanceolate, acutely apiculate, keeled on the back, 1-nerved, margins minutely ciliolate, c. .58 cm. long, c. .27 cm. wide. *Petals* broadly ovate, abruptly acuminate, obtuse, much thickened towards the apex, 3-nerved with the outer nerves much branched, anterior margin abruptly roundly dilate above the middle and adnate in the lower third to the lip, c. .58 cm. long, c. .32 cm. wide. *Lip* adnate to the column and to the anterior margin of the petals, 3-lobed, spurred, 3-nerved from the base with the outer nerves much branched, pale yellow with a white spur, spread out including the spur c. .60 cm. long, c. .30 cm. wide, blade oblong, side lobes crossed over the base of the midlobe narrowly triangular obtuse, midlobe longer and broader c. .17 cm. long c. .12 cm. wide, spur shortly and broadly ovoid very obtuse c. .12 cm. long and broader. *Column* stout, c. .18 cm. tall, auricles as long as the anther adnate beneath to the lip, apex crenate and rugose. *Anther* cells approximate, contiguous.

This plant is a close ally of *P. tobensis* J. J. S. and *P. goodyeroides* Lndl. but differs from both in the structure of petals and lip and in the minutely ciliolate sepals. In the only plant found the leaves were creamy white streaked with green and the bracts were white.*

C. 3353, near Bundu Tuhan at c. 3,000 feet altitude, April, 1933.

Described from dried material and flowers preserved in spirit.

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* From **P. Copelandii** Carr *(Habenaria Copelandii Ames)* from the Philippines it is distinct in the rather smaller flowers with different petals and lip with shorter spur and apical lobules. It is also allied to the Bornean **P. ovariophora** Carr *(Habenaria ovariophora Schltr.)* which has basal leaves and glabrous sepals.

Peristylus ciliatus sp. nov. Caulis erectus, elongatus, validus, foliosus, basi vaginatus. Folia remota c. 8, oblonga, breviter acuminata, acuta. Inflorescentia elongata, subdense multiflora. Bracteæ oblongo-lanceolatæ, longe subulato-acuminatæ, acutissimæ. Sepalum dorsale ovatum, obtusum. Sepala lateralia falcata, oblongo-lanceolata, acute apiculata. Petala e basi angusta late ovata, obtusa. Labellum 3-lobum, calcaratum, lobis lateralibus brevissimis falcatis anguste obtusis, lobo intermedio multo majore arcte triangulari obtuso, lobis carnosis, calcare magno ovoideo acuminato anguste obtuso.

Stem erect, elongate, stout, leafy with c. 4 tubular sheaths at the base, up to c. 56 cm. long. *Leaves* c. 8 in the upper ¾, distant, oblong, shortly acuminate, acute, up to c. 19 cm. long, c. 5.50 cm. wide, sheaths tubular up to c. 7 cm. long. *Inflorescence* elongate, sub-densely very many-flowered, peduncle stout provided with 3-5 lanceolate acuminate acute sheaths, the lowest largest leaf-like, up to c. 29.50 cm. long, rachis often very elongate 22 to 52 cm. long. *Bracts* much exceeding the flowers, oblong-lanceolate, long subulate, very acute, lower ones largest up to 1.75 cm. long, c. .45 cm. wide. Flowers small, not widely expanded. *Dorsal sepal* ovate, obtuse, 1-nerved, margins minutely ciliolate, rather dark green, c. .45 cm. long, c. .27 cm. wide. *Lateral sepals* falcate, oblong-lanceolate, acutely apiculate, 1-nerved, keeled on the back, pale green darker along the middle, c. .50 cm. long, c. .25 cm. wide. *Petals* broadly ovate from a narrow base, obtuse, subfalcate, 2-nerved, much thickened towards the apex and along the anterior margin, minutely papillose, anterior margin adnate at the base to the lip, dark green with a paler base, c. .42 cm. long, c. .28 cm. wide. *Lip* adnate to the column and to the anterior margin of the petals, 3-lobed, spurred, spread out including the spur c. .74 cm. long, c. .30 cm. wide across the side lobes; blade concave green provided with a median whitish keel reaching nearly to the base of the midlobe and 2 very inconspicuous short whitish converging keels arising from the margin at the base of the free part, base elevate at the entrance to the spur; side lobes falcate, triangular, narrowly obtuse, fleshy, dark green, c. .06 cm. long; midlobe much larger, roundly triangular, obtuse, fleshy, dark green, c. .16 cm. long, c. .15 cm. wide at the base; spur stout, ovoid, acuminate, narrowly obtuse, provided with a short basal groove above, keeled beneath, green, c. .30 cm. long. *Column* c. .20 cm. tall, auricles exceeding the anther with the apex a little recurved and the base adnate to the lip. Anther cells approximate.

A large though small-flowered species of which I do not know a near ally.

C. 3368, SFN 27111, head of the Kulapis river c. 4,300 feet, terrestrial in tall damp forest, May, 1933.

Clemens 29816, Tenompok 5,000 feet, June 13th, 1932.

Described from dried material and flowers preserved in spirit.

Peristylus kinabaluensis sp. nov. Caulis erectus, gracilis, foliosus. Folia c. 7, anguste lanceolata, acuta. Inflorescentia elongata, laxe c. 12-flora. Bracteæ ovatæ, triangulari-acuminatæ, acutæ. Sepalum dorsale ellipticum, obtusum, conico-apiculatum. Sepala lateralia falcata, oblonga, obtusa, acute apiculata, extus apicem versus carinata. Petala oblique triangulari-ovata, obtusa. Labellum 3-lobum, calcaratum, lobis lateralibus anguste linearibus, lobo intermedio anguste triangulari obtuso, calcare gracili fusiformi anguste obtuso.

Stem erect, slender, leafy, c. 17 cm. tall, provided at the base with some short tubular sheaths. *Leaves* c. 7, narrowly lanceolate, acute, c. 9.50 cm. long, c. 1.40 cm. wide, sheaths tubular c. 3.50 cm. long. *Inflorescence* elongate, slender, very laxly c. 12-flowered, peduncle terete provided at intervals with 2 tubular sheaths c. 10 cm. long, rachis, c. 16 cm. long. *Bracts* spreading, ovate, triangular-acuminate, acute, 1-nerved, c. .47 cm. long, c. .28 cm. wide. *Flowers* small. *Dorsal sepal* elliptic, obtuse, conic-apiculate, 1-nerved, c. .20 cm. long. c. .16 cm. wide. *Lateral sepals* falcate, oblong, obtuse, acutely apiculate, keeled on the back towards the apex, 1-nerved, c. .26 cm. long, c. .13 cm. wide. *Petals* obliquely triangular-ovate, obtuse, falcate, anterior margin adnate to the lip almost up to the middle, 2-nerved with the anterior nerve branched, c. .27 cm. long, c. .18 cm. wide. *Lip* with the margins of the claw adnate to the auricles of the column into a tube and long adnate to the petals, 3-lobed, spurred, 3-nerved, without the spur c. .40 cm. long, c. .75 cm. wide across the side lobes, side lobes narrowly linear very narrowly obtuse 1-nerved c. .37 cm. long, midlobe narrowly triangular obtuse c. .18 cm. long c. .10 cm. wide, spur slender fusiform narrowly obtuse little curved and parallel to the ovary pendulous c. .60 cm. long. *Column* c. .18 cm. tall, auricles clubbed exceeding the anther. *Anther* cells approximate.

This is apparently very near to *P. papuanus* J. J. S. from Dutch New Guinea but differs i.a. in the much shorter bracts and sepals, the narrower midlobe and shorter spur.*

* From **P. staminodiata** Carr *(Habenaria staminodiata Schltr.)* from the Celebes it differs in the rather longer much narrower leaves, longer inflorescence, rather different larger petals and in the longer spur of the lip.

C. 3389, SFN 27308, by a stream in very young secondary forest between Dallas and Tenompok c. 4,000 feet, May, 1933.

Described from dried material and flowers preserved in spirit.

Peristylus Hallieri J. J. S. in Bull. Dep. Agr. Ind. neerl. XXII (1909), 1; Bull. Jard. Bot. Buit. II. Suppl. t. 2, f. II.

C. 3489, SFN 27445, near Bundu Tuhan, c. 4,000 feet June, 1933. *Sepals bright green. Petals and lip yellow-green, spur greenish with bright green apex.*

Distribution:—Dutch Borneo, Sarawak.

Peristylus grandis Bl. Bijdr. 405, f. 30.

C. 3196, SFN 27149 Menetendok c. 3,000 feet, March, 1933. *Sepals grey-green with paler margins and a darker median line. Petals green. Lip and column green. Leaves green with darker nerves.*

Clemens 26770 Dallas 3,000 feet, September 28th, 1931; s.n. Dallas 3,000 feet, September 2nd, 1931; s.n. Dallas 3,000 feet, September 23rd, 1931.

Distribution:—Sumatra, Java, Malay Peninsula.

Peristylus goodyeroides Lndl. Gen. et Sp. Orch. 299.

C. 3575, SFN 27779 near Bundu Tuhan c. 3,000 feet, July, 1933.

Clemens 26314 Dallas 3,000 feet, September 3rd, 1931; 26482 Dallas 3,000 feet, September 23rd, 1931.

Distribution:—Sumatra, Java, Malay Peninsula, Philippines, Burma, Assam.

Habenaria (§ Salaccenses) **setifolia** sp. nov. Caulis elongatus, superne 5-6-folius. Folia obovata vel oblongo-obovata, breviter acuminata, apice brevissime acutato setifera, membranea. Inflorescentia laxe multiflora. Bracteæ lanceolatæ, longe acuminatæ, acutissimæ. Sepalum dorsale cucullatim convexum, apice recurvo, a latere visum deltoideum apici acuminatum. Sepala lateralia subsigmoidea, anguste ovata, acuminata, obtusa, extus sub apice aristata. Petala super basin biloba, carnosula, lobo postico subulato, lobo intermedio dimidio inferiore anguste oblongo, medio bilobo lobulis anguste subulatis subæqualibus. Labellum 3-lobum, calcaratum, lobis lateralibus super basin bilobis laciniis anguste subulatis, lobo intermedio breviore et latiore subulato.

Stem erect, elongate, stout, sheathed below, 5-6-leaved above, more than 36 cm. tall (base missing). *Leaves* obovate or oblong-obovate, shortly acuminate, very shortly

acutate with an apical seta c. .20 cm. long, membraneous, up to c. 18.50 cm. long, c. 6.33 cm. wide. *Inflorescence* laxly many-flowered, peduncle provided with c. 3 lanceolate acuminate acute sheaths up to c. 3.33 cm. long, c. 12.50 cm. long, rachis more than 8.50 cm. long (upper part missing). *Bracts* spreading, lanceolate, long acuminate, very acute, c. 2.30 cm. long, c. .40 cm. wide. *Dorsal sepal* cucullately convex, seen from the side deltoid with apex acuminate and recurved, nerves 3 elevate outside, c. 1.05 cm. long. *Lateral sepals* subsigmoid, narrowly ovate, acuminate, obtuse, provided outside below the apex with an arista c. .27 cm. long, 3-nerved, c. 1.27 cm. long, c. .43 cm. wide. *Petals* free, bilobed c. .17 cm. above the base, posterior lobule subulate 3-nerved c. 1 cm. long, anterior lobule sigmoid narrowly oblong in the lower half bilobed from about the middle with the lobes subulate the anterior rather shorter than the posterior, in all c. 1.45 cm. long. *Lip* 3-lobed, spurred, c. 1.60 cm. long from base to apex of midlobe; side lobes bilobed c. .17 cm. above the base, lobes narrowly subulate, anterior lobule longer c. 1.70 cm. long; midlobe broader than the side lobes, subulate, c. 1.25 cm. long; spur cylindric, narrowed from the base to c. the middle, upper half a little dilate and incurved rounded on the back flattened in front, c. 1.80 cm. long. *Column* c. .35 cm. tall, anther canals c. .25 cm. long triangular with margins strongly inrolled, rostellum very short triangular blunt porrect c. .08 cm. long produced beneath to 2 divergent linear lobes c. .35 cm. long, stigmata oblong obtuse flattened beneath convex above c. .30 cm. long. *Pollinia* with caudicle c. .60 cm. long, caudicle filiform c. .40 cm. long, disc minute. *Ovary and pedicel* c. 2.50 cm. long.

The nearest affinity of this plant is the Javanese *H. bantamensis* J. J. S., from which it differs in the lobing of petals and lip, the blunt spur and the aristate lateral sepals.

Clemens 28323, Tenompok 5,000 feet February 10th, 1932. "Flowers green".

Described from dried material.

Habenaria damaiensis J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. VIII (1926), 35; l.c. II. Suppl. t. 3, f. IV.

C. 3641 near Kundasan, c. 3,500 feet, August, 1933. *Bracts dark grey-green with paler margins and darker nerves. Dorsal sepal greyish white tinted pale grey-green, apical seta dark olive. Lateral sepals white with pale grey-green nerves and dark olive apical seta. Petals dark brownish olive with white base. Lip base white, lobes brownish olive with white base, spur brownish olive with white base. Column white, anther cells cream.*

Clemens s.n. Tenompok 5,000 feet, February 24th, 1932.

Distribution:—Dutch Borneo, Celebes.

Corybas crenulatus J. J. S. in Bull. Inst. allg. Bot. Hamb. VII (1927) 16, t. II, f. 6.

C. 3205, SFN 26841, Menetendok/Kinataki Divide, c. 3,500 feet, March, 1933. *Leaf green with c. 5 white nerves and white reticulation. Dorsal sepal crimson with white apex and margins. Lateral sepals and petals white. Lip crimson with white margins and a large white median spot, spurs white.*

Distribution:—Dutch West Borneo.

Corybas (§ Calcearia) **kinabaluensis** sp. nov. Tuber subglobosum, villosum. Caulis gracilis, quadrangularis. Folium sessile, caudatum, brevissime acuminatum, acutissimum. Bractea lineari-lanceolata, filiformiter acuminata. Sepalum dorsale oblongum, breviter cuneato-dilatatum, sub apice abrupte in laminam transverse ellipticam angulis acutis dilatatum, apiculatum. Sepala lateralia anguste lineari-lanceolata, acuminata, acutissima. Petala sepalis lateralibus similia sed longiora. Labellum basi erectum intus in tuberculam parvam elevatum, medio fere valde recurvum, marginibus dimidio inferiore sese amplectantibus et tubam formantibus, dimidio superiore suborbiculare retusum parte media late elevata puberulum et papillosum canaliculatum, marginibus apici incurvis irregulariter denticulatis, carinis 2 brevibus conicis.

Tuber subglobose, villous, c. .60 cm. long, c. .45 cm. diam. *Stem* slender, quadrangular with a large basal tubular sheath, c. 2.50 cm. long, c. .15 cm. diam. *Leaf* sessile, cordate, very shortly acuminate, very acute, green often suffused red, nerves 3 and reticulation grooved above elevate beneath white but often red, margins shortly running down the stem, c. 1.90 cm. long, c. 1.50 cm. wide. *Bract* erect, linear-lanceolate, filiform-acuminate, c. .80 cm. long. *Dorsal sepal* oblong, slightly dilate upwards, abruptly dilate below the apex to a transversely elliptic apiculate blade with the lateral angles acute, 3-nerved at the base with the outer nerves branched, keeled and warty outside, apical margin minutely erose, crimson with white margins, dilate part whitish spotted crimson with the apiculus crimson, c. 1.85 cm. long, c. 1 cm. wide below the apex. *Lateral sepals* very narrowly linear-lanceolate, acuminate, very acute, 1-nerved, keeled outside, red tipped white, c. 1.85 cm. long, c. .16 cm. wide. *Petals* longer than the sepals, very narrowly linear-lanceolate, long acuminate, very acute, 1-nerved, keeled outside, red tipped white, c. 2.40 cm. long,

c. .16 cm. wide. *Lip* crimson with white margins, erect in the lower ½ with a small conic tubercle inside at the point of attachment, strongly recurved about the middle, margins in the lower ½ incurved and closely embracing each other and forming a tube, upper ½ well expanded suborbicular c. .95 cm. long c. 1.10 cm. wide the anterior margin incurved retuse irregularly denticulate with the teeth crimson, broadly elevate along the middle with the elevate part puberulous and papillose with a median groove white dotted and suffused crimson, spurs 2 conic crimson c. .15 cm. long. *Column* c. .27 cm. tall, stigma strongly elevate orbicular with raised margins. *Capsule* ovoid with 3 strong ribs, c. .75 cm. long, c. .35 cm. diam.

C. 3067, SFN 26395, Penibukan Ridge at the head of the Mahandui valley, in moss, c. 4,000 feet, March, 1933.

Described from dried material and plants preserved in spirit.

Cryptostylis acutata J. J. S. in Bull. Jard. Bot. Buit. Sér. 3 III (1921), 243; l.c. V (1922), t. 24, III.

C. 3208, SFN 27132, Menetendok/Kinataki Divide c. 3,500 feet, March, 1933.

Clemens s.n. Kamborangah trail 7,000 feet, January 10th, 1932; s.n. Tenompok trail 4,000 feet, September 31st, 1931.

Distribution:—Java, Sumatra.

Cryptostylis arachnites Hassk. Cat. Bog. (1844) 8; Bl. Fl. Jav. n. ser. I (1858), 112, t. 45, f. 2.

C. 3508, SFN 27978 Kamborangah, c. 7,200 feet, June, 1933.

Clemens s.n. Lumu Lumu 6,000 feet, March 23rd, 1932.

Distribution:—Java, Sumatra, Malay Peninsula, Philippines.

Cryptostylis tridentata sp. nov. Folium oblongo-ovatum, breviter acuminatum, acutum, longe petiolatum. Inflorescentia erecta, elongata, laxe pauciflora. Bracteæ lanceolatæ, acutæ. Sepalum dorsale anguste oblongum, apici breviter 2-3-dentatum dente intermedio longiore. Sepala lateralia falcata, anguste oblongo-lanceolata, acuta cum denticulo minuto sub apice. Petala oblonga, apici tridentata dentibus exterioribus extrorsis dente intermedio longiore subulato, marginibus apicem versus minute ciliolatis. Labellum oblongum, super medium triangulariter acuminatum, minutissime apiculatum.

Leaf erect or erecto-patent, oblong-ovate, shortly acuminate, acute, c. 6.50 cm. long, c. 3,25 cm. wide, petiole c. 4.33 cm. long. *Inflorescence* erect, elongate, apex laxly

few-flowered, peduncle terete with some tubular sheaths at the base and 3-4 at intervals above c. 23 cm. long, rachis 3-4 cm. long. *Bracts* lanceolate, acuminate, acute, c. 1.10 cm. long, c. .30 cm. wide. *Dorsal sepal* narrowly oblong with the apex shortly 2-3-toothed the outer teeth minute, 3-nerved, pale green, margins strongly involute, c. 1.22 cm. long, c. .23 cm. wide. Lateral sepals falcate, narrowly oblong-lanceolate, acute with a minute tooth below the apex, 3-nerved, margins strongly involute, pale green, c. 1.30 cm. long, c. .20 cm. wide. *Petals* oblong with the apex truncate 3-toothed, outer teeth extrorse, median longer subulate, margins strongly involute minutely ciliolate towards the apex, pale green, c. .73 cm. long, c. .14 cm. wide. *Lip* erect at the base with the margins embracing the column, recurved below the middle, oblong, triangular-acuminate from above the middle, apex minutely apiculate, densely velutinous except at the base, 2 very inconspicuous keels below the bend with a broad low median keel above the bend not reaching the apex, bright red-brown spotted crimson, base greenish, spread out c. 1.50 cm. long, c. .72 cm. wide. *Column* very short, apex erose with a very short median tooth, pale greenish white, including the anther c. .27 cm. tall, stigma elevate transverse. *Anther* ovate, cream.

This plant is at once distinguished from the other members of the genus by the toothed sepals and petals. J. J. Smith, in Bull. Inst. allgem. Bot. Hamb. VII. 17, considers *Chlorosa Clemensii* A. & S. as a peloric state of a *Cryptostylis* and makes the new combination *Cryptostylis Clemensii* (A. & S.) J. J. S. and it appears possible that it is a monstrous state of the present plant.

C. 3089, SFN 26556, Penibukan Ridge c. 4,500 feet, March, 1933.

Described from dried material and flowers preserved in spirit.

Nervilia punctata Schltr. in Engl. Bot. Jahrb. XLV (1911), 402: *Pogonia punctata* Bl. Mus. I (1849) 32.

C. 3198, SFN 26796, Ulu Kagitang c. 3,500 feet, terrestrial in very young secondary forest, March, 1933.

Distribution:—Java, Sumatra, Malay Peninsula, New Guinea.

Galeola javanica B. & H. Gen. Pl. III (1883) 590.

C. 3199, SFN 26778, Ulu Kagitang c. 3,500 feet, terrestrial in very young secondary forest, March 1933; near Bundu Tuhan c. 4,000 feet, April, 1933: Clemens 27024, Dallas-Tenompok in wet ravine 4,500 feet, November 7th 1931.

Distribution:—Java, Sumatra, Malay Peninsula.

Vanilla sumatrana J. J. S. in Bull. Jard. Bot. Buit. ser. 3. II (1920), 22; l.c. II. Suppl. (1930), t. 6, II.

C. 3417, SFN 27334, Koung, c. 1,400 feet, May, 1933. *Sepals and petals yellow with greenish base and dark green apex, the margins of the sepals green in the upper half. Lip white, the part adnate to the column speckled red-purple, the free part veined dark red-purple, apex pale green. Column white, the free part pale yellow. Anther white.*

Distribution:—Sumatra.

Vanilla kinabaluensis sp. nov. Caulis elongatus, ascendens. Folia oblonga vel oblongo-lanceolata, breviter acuminata, obtusa vel subtruncata, ad. c. 32 cm. longa, c. 10.75 cm. lata, petiolo brevi sulcato. Inflorescentia elongata, dense multiflora, pedunculo brevissimo. Bracteæ late ovatæ, subacutæ. Flores magni. Sepalum dorsale oblanceolatum, obtusum. Sepala lateralia falcata, oblongo-oblanceolata vel obovata, subacuta. Petala anguste obovata, obtusa, extus valde carinata. Labellum 3-lobum, marginibus per ¾ longitudinis gynostemio adnatis parte adnata cuneata, lobis lateralibus semi-orbicularibus marginibus valde undulatis, lobo intermedio breviter latissime ovato obtuso, disco intus carinato apicem versus in fasciam appendicarum cuneatarum denticularum instructo, fascia papillarum ramosarum medio lobi intermedii.

Stem elongate, climbing, stout, 6 m. or more tall. Leaves up to 10 cm. apart, oblong or oblong-lanceolate, shortly acuminate, obtuse or subtruncate with rather thickened margins, flaccid, up to c. 32 cm. long, c. 10.75 cm. wide, sheath grooved little twisted c. 1.50 cm. long. *Inflorescence* from the base of the leaf, elongate, very many-flowered, stout, peduncle c. .50 cm. long, rachis dense up to c. 27 cm. long or more. *Bracts* widely spreading, broadly ovate, subacute, fleshy, c. .60 cm. long, c. .40 cm. wide. *Flowers* large, well expanded, sepals and petals pale yellow. *Dorsal sepal* oblanceolate, obtuse, margins incurved, 9-nerved, c. 6.15 cm. long, c. 2 cm. wide. *Lateral sepals* falcate, oblong-oblanceolate or obovate, subacute, margins incurved, 9-nerved with the outer nerves branched above the base, c. 5.30 cm. long, c. 2.15 cm. wide. *Petals* subsigmoid, narrowly obovate, obtuse, thickened inside along the median line, provided outside with a median low rounded rather flattened keel, 9-nerved with the outer nerves branched, c. 6.10 cm. long, c. 2.40 cm. wide. *Lip* 3-lobed towards the apex, white with the blade veined red-purple and a large pale yellow blotch towards the apex which is suffused red, spread out c. 4.80 cm. long, c. 3.85

cm. wide across the side lobes; blade cuneate, c. 3.70 cm. long, c. 3 cm. wide, the margins adnate to the sides of the column for the whole length, provided with a broad median keel shortly 3-ribbed below the apex and ending below the apex of the adnate part in a bundle of incurved cuneate white lamellæ c. .48 cm. tall c. .85 cm. wide with rounded denticulate apex and some smaller similar lamellæ in front with the lateral margin produced on each side at the apex to a long tooth c. .14 cm. tall c. .70 cm. wide; side lobes semi-orbicular, margins strongly undulate, c. 1.30 cm. long, c. 1.80 cm. wide; midlobe shortly very broadly ovate, obtuse, margins strongly undulate, provided in the middle with a large dense mass of branched dark crimson papillæ which is connected to the bundle of lamellæ on the blade by a short broad 5-ribbed keel, c. .50 cm. long, c. 1.40 cm. wide. *Column* with margins up to the stigma adnate to the blade of the lip, straight, only the apex a little incurved, c. 4.25 cm. tall, rostellum large quadrate with rounded apex completely covering the stigma, anterior margin of stigma elevate. Anther oblong, shortly retuse above, a little recurved above the middle, c. .35 cm. long, c. .33 cm. wide.

This plant is very closely allied to *V. abundiflora* J. J. S., also a Bornean species, but the flowers are larger and the lip, which is more distinctly 3-lobed, differs in the presence of a median keel on the blade, the lack of irregularly seriate warts and in other details. The plant is best distinguished, however, by the lack of appendages on the column.

Rolfe, in Journ. Linn. Soc. XXXII. (1896), 460 refers, under his description of *V. borneensis*, to a flowerless plant collected on the Tampassuk river, *i.e.* the same locality as the present plant, by F. W. Burbidge, a sketch of which is in the British Museum. It appears possible that the plant referred to may belong in fact to the species here described.

C. 3157, Kadamaian (Tampassuk) river c. 2,700 feet, climbing up trees in damp forest at the entrance to Menetendok Gorge, March, 1933.

Clemens 26300, Dallas, 3,000 feet, climbing up trees for 30 feet, August, 1931; 26725, Dallas 3,000 feet, September 15th, 1931.

Described from dried material and flowers preserved in spirit.

Lecanorchis multiflora J. J. S. in Bull. Jard. Bot. Buit. Ser. 2. XXVI (1918), 8; l.c. Ser. 3. V. t. 25, f. II.

C. 3206, SFN 26801 Kinataki stream near Menetendok Gorge c. 3,500 feet, March, 1933.

Distribution:—Java.

Didymoplexis (§ Leucolæna) **kinabaluensis** sp. nov. Rhizoma cylindricum. Inflorescentia erecta, elongata, gracilis, apici dense multiflora. Bracteæ brevissimæ, reflexæ. Sepalum dorsale cum petala in laminam 3-lobam agglutinata, lamina basi sepalis lateralibus breviter adnata, parte libera ovata obtusa. Sepala lateralia in laminam profunde bipartitam adnata, parte libera ovata obtusa. Labellum 3-lobum, breviter unguiculatum, ungui in callum bilobum elevato, super callum carinatum, lobis lateralibus magnis subfalcatis anguste oblongo-obovatis, obtusis lobo intermedio minore triangulari acuminato anguste obtuso. Gynostemium apicem versus dilatatum, stelidiis abrupte decurvis subulatis.

Rhizome cylindric, tapering towards the apex, many-noded with c. 10 tubercular swellings at each node, emitting 2-3 slender roots near the apex, 8 cm. or more long, internodes c. .30 cm. long. *Inflorescence* erect, elongate, slender, dull brown-purple, peduncle up to c. 39 cm. long, rachis densely many-flowered up to c. 13 cm. long. *Bracts* reflexed, ovate, acuminate, acute, c. .13 cm. long. *Dorsal sepal and petals* adnate into a cuneate 3-lobed blade which is adnate at the base for c. .13 cm. to the lateral sepals, sparsely warty outside, dull brown-purple, darker in the middle, margins white, c. .90 cm. long, c. 1.05 cm. wide, Free part of dorsal sepal ovate, obtuse, c. .53 cm. long, c. .39 cm. wide. *Lateral sepals* adnate into an ovate deeply bifid blade which is adnate at the base for c. .13 cm. to the dorsal sepal and petals, sparsely warty outside, similar in colour to the dorsal sepal and petals, c. .63 cm. long, c. .83 cm. wide, free part ovate obtuse c. .40 cm. long c. .45 cm. wide. *Lip* 3-lobed, shortly clawed at the base, the claw provided with a conic callus which is bilobed in front with a rather wide sinus, a median keel from the callus to the apex of the lip, spread out c. .55 cm. long, c. .75 cm. wide across the side lobes, white, the midlobe suffused pale dull purple darker in the middle, base of claw brown-purple, callus blue-green, claw oblong c. .20 cm. long, side lobes large narrowly oblong-obovate obtuse with the anterior margin faintly erose c. .40 cm. long c. .20 cm. wide, midlobe much smaller triangular acuminate narrowly obtuse c. .20 cm. long. *Column* c. .47 cm. tall, white, stelidia abruptly decurved subulate, stigma transversely obreniform. Anther broadly transversely oval.

This species is nearest to *D. Trichechus* J. J. S. from Sumatra. In the structure of the lip it closely resembles *D. philippinensis* Ames from the Philippines but that plant has no stelidia and belongs to the section *Eudidymoplexis*.

C. 3155, SFN 26606, Menetendok Gorge c. 3,000 feet, terrestrial in wet forest, March, 1933.

Described from dried material and flowers preserved in spirit.

Gastrodia grandilabris sp. nov. Rhizoma cylindricum. Inflorescentia elongata, apici laxe ad c. 5-flora. Bracteæ ovatæ, subacutæ. Flores campanulati, sepalis petalisque in tubum latum adnatis, sepalis parte libera ovatis obtusis extus verrucosis. Petala, parte libera, minora, ovata, anguste obtusis. Labellum unguiculatum, lamina apici 3-loba, ungui transverse oblongo apici in callis 2 transverse oblongis instructo, lamina ex ungui constrictione transversa separata abrupte dilatata carinis 3 instructa, lobis lateralibus rotundatis medio margines prope carinis 2 elevatis basin lobi intermedii attingentibus, lobo intermedio ovato obtuso medio callo oblongo sulcato donato. Gynostemio valido, brachiis triangularibus acutis, marginibus sub medio late triangulariter dilatatis, stigmate super basin suborbiculari margine antico paulo elevato.

Rhizome cylindric, tapering towards the apex, c. 8 cm. or more long. *Inflorescence* elongate, slender, erect, peduncle terete furnished with c. 5 short tubular sheaths, up to 27 cm. long, rachis c. 5-flowered c. 2.30 cm. long. *Bracts* ovate, subacute, c. .50 cm. long, c. .35 cm. wide. *Flowers* campanulate with the sepals and petals adnate into a tube dull brown-purple darker in the middle with white margins. *Dorsal sepal* in all c. 1.50 cm. long, the free part ovate obtuse or very shortly retuse, margins incurved at the apex, 3-nerved, tumid wrinkled and coarsely warty outside, c. .60 cm. long, c. .95 cm. wide. *Lateral sepals* c. 1.40 cm. long, free part ovate, obtuse, 4-nerved, wrinkled coarsely warty and keeled outside, margins incurved at the apex, c. .60 cm. long, c. 1.25 cm. wide. *Petals* c. 1.30 cm. long, free part ovate narrowly obtuse 1-nerved c. .37 cm. long c. .40 cm. wide. *Lip* large for the genus, clawed, 3-lobed, keels 3 on the blade between the side lobes the outer a little diverging and reaching to above the middle of the lip the median produced to the midlobe and there dilate to an oblong grooved callus, transversely grooved in the middle white, the midlobe suffused pale dull brown-purple and the base of the claw brown-purple, spread out c. .85 cm. long, c. .57 cm. wide, claw transversely oblong with 2 transversely oblong blue-green calli at the apex, blade separated from the claw by a transverse constriction abruptly dilate from the base and forming with the side lobes a quadrate blade minutely transversely wrinkled, side lobes short broadly rounded, provided in the middle of the margins with 2 converging keels which reach to the base of the midlobe, midlobe ovate obtuse margins minutely erose. *Column* stout, white, c. .90 cm. tall, c. .50 cm. wide below the middle,

arms triangular acute, sides broadly triangularly dilate below the middle, clinandrium excavate suborbicular, stigma borne near the base suborbicular with the anterior margin a little elevate. *Anther* subquadrate, shortly keeled, beak very short rounded, white, c. .15 cm. long, c. .13 cm. wide. *Capsule* ovoid, c. 2.50 cm. long.

This plant appears to be very close to *G. crispa* J. J. S. from Java but it differs in the smaller sepals, the larger lip with very different keels and the longer column with the sides much dilate below the middle. As the capsule ripens the pedicel elongates to c. 20 cm.

C. 3264, SFN 26970, Tenompok/Ranau path saprophytic in humus in tall forest c. 4,800 feet, April, 1933.

Described from dried material and flowers preserved in spirit.

NEOCLEMENSIA Gen. nov.

Planta saprophytica, efoliosa. Rhizoma cylindricum, villosum. Inflorescentia pauciflora. Sepala in tubum adnata, apici tantum libera. Petala basi sepalis adnata, ceterum libera, sepalis multo breviora. Labellum gynostemio adnatum, integrum, basi bicallosum. Gynostemium eo *Gastrodiae* simile, stigmate super basin inserto. Anthera subquadrata.

A leafless saprophyte with the habit of *Gastrodia*. Rhizome cylindric, villous. Inflorescence few-flowered. Sepals adnate into a tube, apex free. Petals adnate to the sepals at the base only, remainder free much shorter than the sepals. Lip adnate to the base of the column, entire, base bicallose. Column similar to that of *Gastrodia*, the stigma borne above the base. Anther subquadrate, 2-celled.

Neoclemensia spathulata sp. nov. Rhizoma cylindricum, villosum, validum. Inflorescentia erecta, apici laxe pauciflora. Bracteæ lanceolatæ, subacutæ. Sepala in tubum adnata, apicem versus libera, sepalo dorsali (parte libera) suborbiculari vel oblongo-ovato apici minute bidentato, sepalis lateralibus (parte libera) ovatis obtusis extus carinatis. Petala basi sepalis breviter adnata, ceterum libera, linearia, apicem prope in laminam ovatam vel suborbicularem longius fimbriatam abrupte dilatata, carnosa, sepalis multo breviora. Labellum integrum, unguiculatum, ungui subquadrato apici in callis 2 subglobosis papillosis et vesiculosis instructo, lamina anguste elliptica obtusa omnino transverse rugulosa dimidio superiore carina brevi biloba donata marginibus minute erosulis papillosisque. Gynostemium validum, brachiis erectis triangularibus acutis, lateribus apicem versus dilatatis

compressis, ventri carinis 2 e rostello usque ad stigma productis, stigmate super basin more *Gastrodiae* orto oblongo.

Rhizome cylindric, villose, stout, part present c. 2.50 cm. long, c. .80 cm. diam. *Inflorescence* erect, very laxly c. 3-flowered, apparently purplish in colour, peduncle terete with c. 6 tubular sheaths at intervals c. 10 cm. long, rachis c. 4.25 cm. long. *Bracts* appressed to the pedicel, lanceolate, subacute, c. .75 cm. long, c. .30 cm. wide. *Flowers* campanulate, c. 2.50 cm. long. *Sepals* adnate into a tube, free and recurved c. a third below the apex, white, free part warty and wrinkled outside. *Dorsal sepal* in all c. 3.40 cm. long, free part suborbicular or oblong-ovate minutely bidentate c. 1.30 cm. long c. 1.50 cm. wide. *Lateral sepals* in all c. 3.50 cm. long, free part ovate obtuse keeled outside margins incurved c. 1.40 cm. long c. 1.60 cm. wide. *Petals* adnate at the base to the lateral sepals for c. .15 cm., remainder free much shorter than the sepals, linear, abruptly dilate near the apex into an ovate or suborbicular rather long-fimbriate blade, fleshy, 3-nerved, bright orange, c. 1.30 cm. long, spathulate part including the fimbriæ c. .25 cm. long c. .35 cm. wide. *Lip* adnate to the base of the column, entire, clawed, apparently dull greenish suffused olive-brown towards the apex, 3-nerved, spread out c. 1.35 cm. long, c. .37 cm. wide, claw oblong or subquadrate provided at the apex with 2 subglobose papillose and vesiculose calli, blade narrowly elliptic obtuse entirely transversely rugulose with a short median bilobed keel in the upper ½ margins erect minutely erose and papillose with a short fold below the apex. *Column* stout, c. .90 cm. tall, arms erect triangular acute, margins dilate and flattened towards the apex, 2 parallel keels run from the rostellum to the apex of the stigma, clinandrium deeply excavate suborbicular, stigma borne above the base in the manner of *Gastrodia* oblong keeled inside, apparently whitish darker between the keels and with orange apex and green base. *Anther* subquadrate, retuse, a little flattened above, 2-celled, c. .15 cm. long and as broad. *Ovary* clavate, dull purple, c. .45 cm. long.

This new genus is very close to *Gastrodia* from which it differs principally in the fact that the petals are almost entirely free and much shorter than the sepals.

Penibukan Ridge c. 3,500 feet, Clemens without number, September, 1933.

Described from dried material.

Erythrodes triloba sp. nov. Caulis basi repens, superne erectus. Folia 4-5, obliqua, oblonga, breviter acuminata, acuta. Inflorescentia erecta, superne dense

multiflora. Bracteæ ovatæ, longe acuminatæ, acutæ, extus dense pilosæ, marginibus ciliatis. Sepalum dorsale oblongum, obtusum, extus clavato-pilosum. Sepala lateralia subfalcata, e basi leviter angustata oblonga, obtusa, extus clavato-pilosa. Petala oblanceolata, obtusa, extus sulcata et medio nonnullis pilis donata. Labellum 3-lobum, calcaratum, lobis lateralibus brevibus rotundatis, lobo intermedio latiore transverse elliptico breviter apiculato sulcato super basin utrinque paulo elevato margines versus papilloso, calcare recto ventre dorsoque compresso breviter bilobo intus utrinque carinato exappendiculato.

Stem creeping and prostrate at the base and emitting a stout terete villose root from each node, erect and leafy above. *Leaves* 4-5, oblique, oblong, shortly acuminate, acute, grey-green, c. 7.50 cm. long, c. 2.80 cm. wide, petiole 1-2 cm. long, sheath tubular dilate at the apex, up to c. 1.50 cm. long. *Inflorescence* erect, densely many-flowered, peduncle terete hairy provided with c. 7 lanceolate acute sheaths c. 20 cm. long, rachis hairy up to c. 6.50 cm. long. *Bracts* ovate, long acuminate, acute, 3-nerved, densely hairy outside, margins ciliolate, c. 1.15 cm. long, c. .40 cm. wide. *Flowers* well expanded, the sepals light brown, clavate-hairy outside. *Dorsal sepal* oblong, obtuse, 3-nerved, margins ciliate, c. .58 cm. long, c. .18 cm. wide. *Lateral sepals* reflexed, base a little narrowed, oblong, obtuse, 3-nerved, c. .58 cm. long, c. .26 cm. wide. *Petals* agglutinate to the dorsal sepal forming a hood, oblanceolate, obtuse, grooved outside with a few hairs in the middle, c. .55 cm. long, c. .15 cm. wide, white, suffused pale brown down the middle and towards the base. *Lip* 3-lobed, spurred, white, suffused dark brown at the base of the blade, spread out with the spur c. .93 cm. long, c. .28 cm. wide; side lobes very short, erect, roundly triangular, very obtuse; midlobe broader than the side lobes, transversely elliptic, shortly apiculate, grooved in the middle with a low elevation on each side near the base, papillose near the margins, c. .15 cm. long, c. .28 cm. wide; spur straight, slightly dilate below the apex, flattened in front and on the back, provided inside with 2 lateral keels which run the whole length and terminate below the tip, c. .45 cm. long. *Column* white, c. .40 cm. tall, rostellum narrowly triangular with bifid apex, stigma semiorbicular with the posterior margin ending in 2 teeth. *Anther* oblong, triangular-acuminate from c. the middle, provided above with a broad tapering keel, base shortly bilobed, pale brown, c. .37 cm. long.

This plant appears to be next to *E. Wenzelii* Ames from the Philippines from which it differs in the 3-lobed lip and the keels of the spur.

C. 3564, SFN 27859, Tenompok c. 4,700 feet, terrestrial by the bridle path to Ranau, June, 1933.

Clemens 27689, Tenompok 5,000 feet, February 24th, 1932; 28420, Tenompok 5,000 feet, February 13th, 1932.

Described from dried plants and flowers preserved in spirit.

Erythrodes humilis J. J. S. in Bull. Dep. Agr. Ind. Neerl. xiii (1907), 11.

C. 3771, Kiau c. 3,000 feet, March, 1933.

Distribution:—Java, Sumatra, Malay Peninsula.

Vrydagzynea albida Bl. Fl. Jav. n. ser. I, Orch. (1858) 61, t. 20, f. 3.

C. 3765, SFN 28057, Ulu Kulapis c. 4,500 feet, June, 1933.

Clemens s.n. Tenompok 5,000 feet, March 4th, 1932.

Distribution:—Java, Sumatra, Malay Peninsula, Philippines.

Vrydagzynea bractescens Ridl. in Kew Bull. 1926, 87.

C. 3766, Lobang c. 4,000 feet, April, 1933. *Sepals greenish tipped white. Petals and lip white.*

Distribution:—Sumatra.

Vrydagzynea elata Schltr. in Fedde Rep. IX (1911), 430.

C. 3384, SFN 27979, near Bundu Tuhan at c. 4,000 feet altitude, May, 1933. *Leaves dark olive above with 3 paler nerves, beneath pale olive suffused pale purple with 3 bright olive nerves. Stem dull purple, sheaths dull red-purple. Inflorescence green. Bracts pink with olive base. Sepals green, the upper half white turning cream with a dull brown median spot. Petals, lip and spur white.*

Distribution:—Sarawak.

Vrydagzynea argentistriata sp. nov. Caulis basi breviter repens, radicans, ceterum erectus, apicem versus foliatus. Folia c. 6, obliqua, lanceolata, acuta. Inflorescentia brevissima, dense multiflora. Bracteæ oblongo-ovatæ, acuminatæ, anguste obtusæ, extus basin versus pubescentes, marginibus ciliatis. Sepalum dorsale dimidio inferiore oblongum, medio fere angustatum, dimidio superiore anguste oblongum obtusissimum. Sepala lateralia multo majora, oblique oblonga, acuminata, anguste obtusa. Petala brevia, oblique ovata, acuminata, obtusissima, margine antico basi in lobum rotundatum conspicue dilatato. Labellum integrum, calcaratum, lamina oblonga apicem obtusissimum

versus dilatata medio incrassata et papillosa, calcare ovoideo obtuso intus appendicibus 2 ovoideis stipitatis stipitibus dimidio apicali liberis donato.

Stem shortly creeping at the base, remainder erect leafy towards the apex dull brownish green or brownish purple c. 16 cm. tall. *Leaves* c. 6, oblique, lanceolate, acute, margins undulate, bright green slightly glistening above often with darker reticulation and a silver median line and silver margins, beneath dark grey-green with 3 darker nerves, c. 4.30 cm. long, 1.40-2.20 cm. wide, sheaths loosely tubular pale grey-green with fuscous nerves together with the short petiole c. 1.30 cm. long. *Inflorescence* very short, densely many-flowered, peduncle c. .50 cm. long, rachis c. 1.50 cm. long. *Bracts* oblong-ovate, acuminate, narrowly obtuse, 1-nerved, outside pubescent towards the base keeled towards the apex, margins ciliate, c. .78 cm. long, c. .25 cm. wide. *Sepals* olive green often suffused dull red, the apex white. *Dorsal sepal* oblong, narrowed about the middle then narrowly oblong very obtuse, thickened and fleshy in the upper third except on the margins, 1-nerved, c. .40 cm. long, c. .13 cm. wide. *Lateral sepals* much larger, obliquely oblong, acuminate, narrowly obtuse, 1-nerved, thickened and fleshy along the middle in the upper ½, c. .55 cm. long, c. .20 cm. wide. *Petals* short, obliquely ovate, acuminate, very obtuse, 1-nerved, thickened and fleshy in the upper ½, not clawed at the base, white, c. .30 cm. long, c. .17 cm. wide. *Lip* entire, spurred, white, including the spur c. .68 cm. long, grooved beneath for the whole length; blade oblong, a little dilate below the very obtuse apex, margins incurved from above the base and contiguous towards the apex, broadly elevate and papillose along the median line, spread out c. .34 cm. long, c. .20 cm. wide; spur straight, ovoid, obtuse, flattened on the back, flattened and grooved in front, a little laterally dilate about the middle, provided inside with 2 ovoid stipitate dull ochre-yellow glands with the pedicel free only in the upper ½, white, c. .34 cm. long, c. .18 cm. diam. *Column* dilate upwards from a narrow base with 2 divaricate keels from the base to the apex of the stigmata separated by a triangular depression, stigmata 2 triangular obtuse, in all c. .25 cm. tall. *Anther* ovate, acuminate, acute, c. .23 cm. long.

This species is of the affinity of *V. albida* Bl. and may readily be distinguished by the marked difference in the dimensions of the sepals and by the small characteristic petals. The leaves with their silver median streak and narrow silver margins are also a distinguishing feature.

C. 3713, SFN 28051, near Bundu Tuhan c. 3,000 feet. Plants were brought alive to Singapore where they flowered in October, 1933.

Described from dried plants and flowers preserved in spirit.

Vrydagzynea bicostata sp. nov. Caulis basi breviter repens, ceterum erectus c. 6-folius. Folia oblique elliptica, breviter acuminata, acuta, nervis superne reticulatis omnino elevatis. Inflorescentia brevia, multiflora. Bracteæ floribus fere æquimagni, lanceolatæ, acuminatæ, acutæ. Sepalum dorsale oblongum, acuminatum, obtusum, apicem versus incrassatum. Sepala lateralia majora, oblongo-ovata, breviter acuminata, obtusa, apice incrassate. Petala longius unguiculata, lamina oblique ovata breviter acuminata obtusa, apicem versus incrassata. Labellum integrum, calcaratum, lamina elliptica obtusa marginibus apicem versus incurvis contiguisque apici papillosis medio bicarinata carinis apicem versus clavato-dilatatis, calcare cylindrico obtuso apicem versus recurvo et ovario appresso intus glandulis 2 ovoideis pediceliatis pedicellis longe liberis donato.

Stem shortly creeping at the base and emitting a stout villose root from each node, remainder erect, stout, leafy towards the apex, c. 27 cm. long, internodes up to c. 4.50 cm. long. *Leaves* c. 6, obliquely elliptic, shortly acuminate, acute, shiny dark green above with elevate nerves and reticulation, c. 7.75 cm. long, c. 4.50 cm. wide, petiole grooved c. 1.50 cm. long, sheaths loosely tubular up to c. 1.75 cm. long. *Inflorescence* short, densely many-flowered, peduncle up to c. 1.50 cm. long provided with some large bract-like sheaths, rachis c. 3 cm. long. *Bracts* very large, as long as the flower, broadly lanceolate, acuminate, acute, 1-nerved, margins ciliate, c. 1.65 cm. long, c. .38 cm. wide. *Sepals* bright green more or less suffused red. *Dorsal sepal* oblong, acuminate, obtuse, thickened and fleshy towards the apex, 1-nerved, apiculate, c. .50 cm. long, c. .19 cm. wide. *Lateral sepals* larger and much broader,obliquely oblong-ovate, shortly acuminate, obtusely apiculate, apex thickened and fleshy, 1-nerved, anterior margin produced and roundly dilate at the base, c. .56 cm. long, c. .33 cm. wide. *Petals clawed* at the base, white, 1-nerved, c. .47 cm. long, c. .18 cm. wide, claw oblong c. .12 cm. long, blade falcate obliquely ovate shortly acuminate obtuse convex and grooved outside about the middle apex thickened and fleshy. *Lip* entire, spurred, white, in all c. .98 cm. long; blade elliptic, obtuse, provided along the middle with 2 clubbed keels which do not reach the apex, margins incurved contiguous and papillose at the apex, c. .42 cm. long, c. .27 cm. wide; spur cylindric, obtuse, a little recurved and appressed to the ovary below the apex, grooved on the back, provided inside

with 2 pedicelled ovoid glands with the pedicels free for more than ½ their length, c. .48 cm. long. *Column* stout, c. .33 cm. tall, rostellum subulate, stigmata 2 quadrate the apex truncate and a little recurved. *Anther* cordate, shortly keeled in front, beak short triangular acute, c. .20 cm. long, c. .18 cm. wide.

This rather distinct species may readily be recognised by the elevate nerves and reticulation of the leaves, the rather long-clawed petals, the 2-keeled lip blade and the short cordate anther.

C. 3344, SFN 27134, Upper Kinunut valley c. 4,000 feet, April, 1933.

Described from dried plants and flowers preserved in spirit.

Vrydagzynea grandis A. & S. Orch. VI (1920), 16.

C. 3195, SFN 26776, Lobang c. 4,200 feet, March, 1933. *Leaves green. Ovary white tipped green. Sepals green tipped white. Petals whitish. Lip white.*

Clemens 28242, Tenompok 5,000 feet, February 5th, 1932; 28344, Tenompok 5,000 feet, February 11th, 1932.

Distribution:—Endemic.

Anœctochilus setaceus Bl. Bijdr. 412, f. 15; Fl. Jav. Orch. 38, t. 12, f. 1, t. 17 A.

C. 3084, SFN 26533, Penibukan Ridge c. 4,500 feet, March, 1933.

Clemens s.n. below Lumu Lumu? 5,000 feet, January 7th, 1932.

Distribution:—Java.

Anœctochilus integrilabris sp. nov. Caulis basi repens radicans, deinde erectus c. 4-5-folius. Folia obliqué ovata, acuta, marginibus undulatis. Inflorescentia erecta, apici laxe ad c. 6-flora. Bracteæ triangulari-ovatæ, acutæ, extus pilosæ. Flores vix expansi. Sepalum dorsale late lanceolatum, breviter acuminatum, acutum, extus clavatopilosum. Sepala lateralia oblonga, breviter acuminata, acuta, super medium paulo dilatata, extus clavato-pilosa. Petala oblonga triangulariter acuminata, acuta, super medium leviter dilatata, extus sulcata. Labellum integrum, calcaratum, lamina late lanceolata abrupte acuminata acuta marginibus apici incurvis contiguisque extus margines prope sub medio usque ad apicem fere utrinque fimbriis c. 10 donata, calcare ovoideo vel conico apici inæqualiter et brevissime bilobulo intus sub apice glandula verrucosa.

Stem creeping at the base and emitting a villose root from each node, then erect rather slender with c. 4-5 leaves, c. 12 cm. long or more. *Leaves* obliquely ovate, acute, margins undulate, very dark shiny green above with nerves and reticulation pale flesh colour or pink, pinkish purple beneath, 1.50-4.75 cm. long, 1-3.50 cm. wide, petiole grooved together with the tubular pink sheaths c. 1-1.50 cm. long. *Inflorescence* erect, laxly c. 6-flowered or less, very pale greenish, peduncle up to 16 cm. long clothed at intervals with 2-3 pink sheaths which are shortly tubular at the base with the free part ovate acute, rachis up to c. 2.50 cm. long. *Bracts* triangular-ovate, acute, hairy outside, bright rose, c. 1.50 cm. long, c. .85 cm. wide. *Flowers* not widely expanded, the sepals clavate-hairy bright rose-red with olive green base outside, whitish inside. *Dorsal sepal* broadly lanceolate, shortly acuminate, acute, 1-nerved, c. 1.07 cm. long, c. .45 cm. wide. *Lateral sepals* oblong, shortly acuminate, acute, a little dilate above the middle, 1-nerved, anterior margin produced and roundly dilate at the base embracing the lip, c. 1.07 cm. long, c. .42 cm. wide. *Petals* oblong, triangular-acuminate from above the middle, acute, a little dilate above the middle, grooved outside, 1-nerved, pure white, c. 1.05 cm. long, c. .30 cm. wide. *Lip* entire, spurred, pure white, spread out including the spur c. 1.45 cm. long, c. .45 cm. wide across the blade; blade lanceolate, abruptly narrowed about the middle and acuminate, acute, margins incurved and contiguous at the apex remainder erect provided beneath near the margins on each side with c. 10 fimbriæ of which the inner 4 are longer and c. .50 cm. long the 3 outer ones on each side tapering, c. 1.02 cm. long, c. .45 cm. wide; spur ovoid or conic, flattened and grooved beneath, apex oblique or minutely and unequally bilobed, provided inside near the tip with a coarsely warty gland, c. .43 cm. long, c. .23 cm. diam. *Column* white, c. .70 cm. long, the underside provided with 2 triangular shortly acuminate fleshy keeled lamellæ, clinandrium deeply excavate suborbicular or subquadrate convex inside, stigmata 2, oblong elevate wrinkled separated by a suborbicular excavation. *Ovary* densely long-hairy, c. 1.50 cm. long.

Undoubtedly this is a close ally of *A. insignis* Schltr. from the Celebes but it differs distinctly in the smaller stature, smaller sepals and petals and rather different lip.

C. 3162, SFN 26634, at the entrance to Menetendok Gorge c. 2,700 feet, March, 1933, terrestrial in very young secondary forest.

Described from dried material and flowers preserved in spirit.

Myrmechis kinabaluensis sp. nov. Caulis basi repens, superne erectus. Folia ad c. 9, ovata, acuta, marginibus minute undulatis. Inflorescentia erecta, apici 1-3-flora. Bracteæ triangulari-ovatæ. Sepalum dorsale lanceolatum, obtusum. Sepala lateralia subfalcata, oblongo-lanceolata, obtusa. Petala oblongo-lanceolata, acuminata, obtusa, extus sulcata. Labellum integrum, basi saccatum, lamina oblonga obtusa marginibus ¼ parte apicali excepta valde incurvis contiguis tubum formantibus, sacco subgloboso intus utrinque glandula subglobosa sessili donato.

Stem creeping and rooting at the base, erect and leafy above, up to c. 17 cm. long, internodes up to c. 2.75 cm. long. *Leaves* up to c. 9, ovate, acute, margins minutely undulate, green, 1.10-1.75 cm. long, .65-1.10 cm. wide, petiole grooved c. .24 cm. long, sheath infundibuliform as long. *Inflorescence* very short, erect, 1-3-flowered, peduncle c. .70 cm. long provided with a large ovate acute sheath, rachis in flowering c. .50 cm. in fruiting c. 2.80 cm. long. *Bracts* triangular-ovate, acute, keeled outside, green, c. .80 cm. long, c. .53 cm. wide. *Flowers* not well expanded, pure white. *Dorsal sepal* lanceolate, obtuse, 1-nerved, warty outside, c. .70 cm. long, c. .35 cm. wide. *Lateral sepals* subfalcate, oblong-lanceolate, obtuse, 1-nerved, anterior margin produced and rounded at the base, keeled and warty outside, c. .70 cm. long, c. .35 cm. wide. *Petals* free, oblong-lanceolate, obtuse, grooved outside, c. .65 cm. long, c. .30 cm. wide. *Lip* entire, saccate at the base, spread out c. .70 cm. long, c. .25 cm. wide across the sac, blade oblong obtuse with the margins strongly incurved and contiguous in the lower ¾ forming a tube, the apical margin suberect c. .37 cm. long, sac subglobose provided within on each side with a subglobose sessile entire glabrous gland c. .33 cm. long c. .28 cm. wide. *Column* dilate upwards, c. .20 cm. tall, provided in front with a short keel ending above in 2 minute tubercles, rostellum very short triangular bilobed with a broad rounded sinus, stigmata 2 widely separated suborbicular. *Anther* cordate, acuminate, very obtuse. *Pollinia* 2 pyriform, grooved, attached near the middle of an orbicular disc.

C. 3539, SFN 27595, above Kamborangah c. 9,000 feet, terrestrial in very wet, mossy, though rather stunted forest, June, 1933.

Clemens 29217, Masilau 7,000 feet, April 9th, 1932.

Described from dried material and flowers preserved in spirit.

Zeuxine strateumatica Schltr. Orch. D. N. Guinea (1911), 77.

C. 3722, SFN 28053, near Dallas c. 3,000 feet, brought alive to Singapore where it flowered in October, 1933.

Clemens 27555, Dallas 3,000 feet, December, 1931.

Distribution:—Java, Sumatra, Malay Peninsula, Amboina, Philippines, China, Japan, Afghanistan, Assam, India and Ceylon.

Zeuxine gracilis Bl. Fl. Jav. n. ser. I (1858), 56, t. 18, f. 2, t. 23 D.

C. 3177, SFN 26756, terrestrial by the side of the Kadamaian river above Menetendok Gorge c. 2,800 feet, March, 1933.

Distribution:—Java, Sumatra, Malay Peninsula.

Zeuxine papillosa sp. nov. Caulis basi breviter repens, ceterum erectus, gracilis. Folia c. 5, ovata vel ovato-lanceolata, acuta. Inflorescentia erecta, gracilis, pauciflora. Bracteæ ovatæ, acuminatæ, acutæ, extus pilosæ et papillosæ. Sepala extus papillosa pilosaque, 3-nervia. Sepalum dorsale triangulari-ovatum, obtusum. Sepala lateralia oblongo-lanceolata, obtusa. Petala deltoidea, obtusa, margine postico fere recto, margine antico medio triangulariter dilatato minute ciliolato, labellum basi saccatum, apici bilobum, sacco suborbiculari intus appendicibus 2 cornuformibus recurvis donato, lamina oblonga marginibus basi incurvis carnosis super medium in lobos 2 divaricatos oblongo-obovatos inconspicue retusos instructa papillosa.

Stem shortly creeping at the base and rooting at the nodes, remainder erect, leafy, slender, green, up to c. 16 cm. long, internodes up to c. 3.40 cm. long. *Leaves* c. 5, ovate or ovate-lanceolate, acute, green, 1-2.80 cm. long, .70-1.15 cm. wide, petiole grooved together with the tubular sheath c. 1.10 cm. long. *Inflorescence* erect, slender, green laxly white-hairy, laxly 5-10-flowered, peduncle up to c. 8 cm. long provided with 2 ovate acuminate acute sheaths, rachis up to c. 4 cm. long. *Bracts* ovate, acuminate, acute, hairy and papillose outside, very pale flesh colour, c. .70 cm. long. *Sepals* hairy and papillose outside, 3-nerved. *Dorsal sepal* triangular-ovate, obtuse and cucullate at the apex, green tipped white, c. .52 cm. long, c. .40 cm. wide. *Lateral sepals* oblong-lanceolate, obtuse and cucullate at the apex, keeled outside, green, c. .47 cm. long, c. .18 cm. wide. *Petals* agglutinate with the dorsal sepal into a hood, deltoid, very shortly triangular-acuminate, obtuse and hooded at the apex,

posterior margin nearly straight, anterior margin roundly triangularly dilate in the middle and minutely ciliolate, 2-nerved, outside grooved and papillose except near the posterior margin, white, c. .50 cm. long, c. .18 cm. wide. *Lip* saccate at the base, bilobed at the apex, spread out c. .52 cm. long, c. .55 cm. wide, white; sac suborbicular, margins appressed to the column, provided inside with 2 horn-like recurved appendages, c. .17 cm. long; blade oblong with the margins at the base incurved and fleshy, dilate at the apex to 2 diverging oblong-obovate inconspicuously retuse lobes which form an obtuse angle with each other, c. .35 cm. long, c. .55 cm. wide across the apex of the lobes, papillose, lobes c. .27 cm. long c. .19 cm. wide. *Column* green, c. .26 cm. tall, provided in front with 2 lower extrorse papillose lamellæ which are produced at the base to a short triangular lobe, rostellum bifid with the lobes dilate below the apex provided beneath at the base with a papillose cushion, stigmata 2 oblong or suborbicular elevate wrinkled. *Anther* cordate, acuminate, acute, c. .24 cm. long, c. .15 cm. wide. *Pollinia* 2, pyriform, caudicle linear, disc triangular.

A slender plant of the affinity of *Z. gracilis* Bl. but readily distinguished by the larger flowers with hairy and papillose sepals and the papillose petals with the anterior margin minutely ciliolate.

C. 3159, SFN 26671, terrestrial by the Kadamaian river in the neighbourhood of Menetendok Gorge c. 2,800 feet, March, 1933.

Described from dried material and flowers preserved in spirit.

Hetæria angustifolia sp. nov. Caulis basi radicans, superne foliosus. Inflorescentia pilosa, pauciflora. Bracteæ late ovatæ, breviter acuminatæ, acutæ, extus pilosæ. Sepala extus pilosa, ovata, obtusa, lateralibus falcatis. Petala glabra, e basi brevissime unguiculata, obovata, obtusa, extus canaliculata, margine postico recto, margine antico late rotundatim dilatato. Labellum saccatum, 3-lobum, sacco intus carinato basin versus appendicibus 2 cuneatis vel oblongis truncatis vel inconspicue retusis donato, lobis lateralibus brevibus rotundatis, lobo intermedio oblongo brevissime bilobulo breviter puberulo concavo. Gynostemium breve, intus lamellis 2 parallelibus altis donatum.

Stem rooting at the base, leafy above, c. 13 cm. long, internodes up to c. 2 cm. long. *Leaves* lanceolate, acute, grooved above, keeled beneath, dark green with a median pink line, up to c. 5.25 cm. long, c. .80 cm. wide, base narrowed to a petiole up to c. .50 cm. long, sheath tubular c. .80 cm. long including the free apex. *Inflorescence*

shortly hairy, laxly few-flowered, peduncle c. 2 cm. long provided above the base with a short tubular sheath, rachis c. 5 cm. long. *Bracts* broadly ovate, shortly acuminate, acute, hairy outside, 1-nerved, c. .60 cm. long, c. .43 cm. wide. *Sepals* hairy outside, ovate, obtuse, 1-nerved, the laterals falcate, olive, .37-.42 cm. long, c. .25 cm. wide. *Petals* cohering to the dorsal sepal in the form of a hood, glabrous, base minutely clawed, blade obovate obtuse, grooved outside, posterior margin nearly straight, anterior margin roundly dilate, white, c. .37 cm. long, c. .20 cm. wide. *Lip* saccate, 3-lobed, grooved beneath, sac shallow keeled inside with the keel dilate to a conic tubercle in the upper half and provided near the base with 2 cuneate or oblong forward-pointing fleshy appendages with truncate or inconspicuously retuse apex, spread out in all c. .47 cm. long, c. .40 cm. wide, sac red; side lobes erect, white, very short, rounded, forming with the sac a subquadrate hypochile which is a little narrowed in the middle; midlobe oblong, shortly roundly bilobed, a little contracted in the middle, shortly puberulous, concave inside, grooved outside, white, c. .13 cm. long. *Column* c. .20 cm. tall, clavate-dilate from a narrow base, bilamellate in front, the lamellæ tall parallel oblong with rounded apex and truncate base and a transverse keel outside above the base. *Anther* broadly ovate, shortly acuminate, acute, c. .15 cm. long.

This is nearest to *H. purpurascens Bl.* from Java but it differs in the details of the lip and in the very large lamellæ of the column.

C. 3770 Main spur above Koung c. 2,500 feet, December, 1933.

Described from a dried plant and flowers preserved in spirit.

Cystopus Hasseltii Bl. Fl. Jav. Orch. 72, t. 30, f. 3. t. 36 B.

C. 3736, SFN 28055, near Tenompok c. 5,000 feet, August, 1933.

Distribution:—Java.

Macodes Petola Lndl. Gen. & Sp. Orch. (1840), 497.

C. 3334, Mahandui river on Penibukan Ridge c. 3,500 feet, April, 1933.

Distribution:—Java, Sumatra, Malay Peninsula, Philippines.

Macodes angustilabris J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. XI (1931), 90.

C. 3491, near Bundu Tuhan c. 4,000 feet, June, 1933.

Distribution:—Dutch Central East Borneo.

Dicerostylis kinabaluensis sp. nov. Caulis elongatus, validus. Folia ad c. 7, oblongo-lanceolata vel oblongo-oblanceolata, breviter acuminata, acuta. Inflorescentia dense multiflora. Bracteæ late lanceolatæ, acuminatæ, acutæ, extus pilosæ. Sepala ovata, breviter acuminata, anguste obtusa, lateralibus latioribus margine antico basi rotundatim producto, extus pilosa. Petala e basi angusta ovata, breviter acuminata, acuta, extus sulcata dimidio inferiore breviter laxe pilosa. Labellum integrum, saccatum, sacco magno inflato subgloboso extus bicarinato inter carinas sulcato intus medio fere carinis brevibus 6 apici in tuberculam parvam erectam elevatis, lamina recurva subulata sulcata.

Stem with the base prostrate with 1-3 stout villose roots from each node, remainder erect stout leafy towards the apex, up to c. 64 cm. long, internodes c. 3 cm. long. *Leaves* c. 7, oblong-lanceolate or oblong-oblanceolate, shortly acuminate, acute, dark green, 8.50-13 cm. long, 3-5 cm. wide, petiole grooved together with the loosely tubular sheath up to c. 3.50 cm. long. *Inflorescence* erect, densely many-flowered, peduncle up to c. 3 cm. long hairy, rachis hairy c. 9 cm. long. *Bracts* broadly lanceolate, acuminate, acute, 3-nerved, hairy outside, c. 1.70 cm. long, c. .58 cm. wide. *Sepals* 3-nerved, hairy outside. *Dorsal sepal* ovate, shortly acuminate, narrowly obtuse, olive suffused dull red in the upper ½, c. 1.08 cm. long, c. .58 cm. wide. *Lateral sepals* subfalcate, ovate, shortly acuminate, narrowly obtuse, strongly reflexed from the base, anterior margin roundly produced at the base, apex recurved, olive tipped dull red, c. 1.08 cm. wide, c. .70 cm. wide. *Petals* ovate from a narrow base, shortly acuminate, acute, 3-nerved, grooved outside and shortly laxly hairy below the middle of the anterior ½, rose-red, c. 1.08 cm. long, c. .50 cm. wide. *Lip* entire, saccate at the base, in all c. .70 cm. long; sac subglobose, dilate on the sides and inflated, provided outside with 2 keels separated by a groove, 6 low short keels inside about the middle ending in a small erect tubercle, bright yellow, c. .60 cm. long and as broad; blade recurved, subulate, grooved, rose-red, c. .50 cm. long, c. .15 cm. wide. *Column* shortly adnate at the base to the margins of the sac of the lip, dilate upwards, c. .80 cm. long, c. .25 cm. wide, keeled in front with the keel ending below the stigma in 2 triangular extrorse teeth, clinandrium oblong margins erect with a minute tooth below the middle, rostellum oblong triangular-acuminate from about the middle with recurved

margins the apex provided with a minute tooth grooved beneath, stigma crescent-shaped. *Anther* oblong, triangular-acuminate, acute, keeled, base bilobed, c. .70 cm. long, c. .20 cm. wide. *Pollinia* grooved, pyriform, disc narrowly elliptic, in all c. .60 cm. long.

C. 3614, SFN 27861, near Bundu Tuhan c. 3,000 feet, July, 1933.

Clemens 29877, Tenompok 5,000 feet, June 13th, 1932.

Described from dried material and flowers preserved in spirit.

Lepidogyne longifolia Bl. Fl. Jav. n. ser. I (1858), 78. t. 25.

C. 3137, SFN 27951, near Kiau c. 3,000 feet, March, 1933.

Clemens 27725, Dallas 3,000 feet, December 31st, 1931; 29898, Tenompok 5,000 feet, June 13th, 1932.

Distribution:—Java, Sumatra, Malay Peninsula, Philippines, ? N. Guinea.

Goodyera kinabaluensis Rolfe in Gibbs in Journ. Linn. Soc. xlii (1914), 159.

C. 3179, SFN 27337, Menetendok c. 3,000 feet, March, 1933. *Leaves very dark velvety green with margins, 5 nerves and reticulation rose-red, rose-lilac beneath;* C. 3419, SFN 27337 between Kelawat and Koung c. 2,500 feet, May, 1933. *Leaves dark green with red nerves and reticulation above, lilac beneath, sheaths pale rose. Inflorescence pale green. Bracts pink. Sepals dark olive suffused rose-red especially towards the apex. Column pale yellow, appendages white with a green spot at the base. Anther pale red-brown.*

Clemens 27695, Dallas 3,000 feet, December 30th, 1931.

Distribution:—Endemic.

Goodyera rubicunda Lndl. in Bot. Reg. XXV (1839), Misc. 61.

C. 3757, SFN 28054, near Dallas c. 3,000 feet, August, 1933.

Clemens 26308, Dallas 3,000 feet, September 4th, 1931; 26896, Dallas 3,000 feet, November 1931; 26997, Dallas 3,000 feet, November 6th, 1931.

Distribution:—Java, Sumatra, Malay Peninsula, Dutch Borneo, Celebes, Philippines, Amboina, Moluccas, N. Guinea.

Goodyera rosans J. J. S. in Bull. Jard. Bot. Buit. Ser. 3. IX (1927), 34, t. 3, f. IV.

C. 3572, SFN 27977, near Koung c. 1,400 feet, June, 1933.

Distribution:—Java.

Goodyera ustulata sp. nov. Planta pusilla. Caulis basi breviter repens, ceterum erectus. Folia c. 4, leviter obliqua, oblongo-ovata, breviter acuminata, acuta vel anguste obtusa. Inflorescentia erecta, laxe multiflora. Bracteæ ovatæ, acuminatæ, acutæ, extus pilosæ, marginibus ciliolatis. Sepalum dorsale ovatum, acuminatum, obtusum, extus clavatopilosum. Sepala lateralia basi falcata, ovata, acuminata, obtusa, extus clavato-pilosa. Petala e basi longe unguiculata ovata, obtusa, ungui cuneato, laminæ marginibus irregularibus. Labellum integrum, basi saccatum, sacco transverse elliptico intus nonnullis fascibus muricium donato, lamina ovata acuminata obtusa basi in tuberculas 2 approximatas instructa tuberculis apici in carinam brevem inconspicuam productis.

A small plant, c. 11 cm. tall. *Stem* very shortly creeping at the base and emitting a stout villose root from each node, remainder erect rather stout, pinkish purple, up to c. 7.50 cm. long, internodes up to 1 cm. long. *Leaves* c. 4, a little oblique, oblong-ovate, shortly acuminate, acute or narrowly obtuse, green above but dark green often suffused purplish towards the margins with 5 nerves and reticulation silver, purplish beneath with the median line green, 1.50-6.75 cm. long, .66-2.85 cm. wide, petiole grooved together with the tubular sheath up to c. 2 cm. long. *Inflorescence* erect, laxly many-flowered, hairy, pinkish purple, peduncle up to c. 1 cm. long with 1-2 large sheaths, rachis c. 4 cm. long. *Bracts* ovate, acuminate, acute, hairy on the back, margins ciliolate, pinkish purple, c. 1 cm. long, the upper ones shorter. *Sepals* clavate-hairy outside, ochre suffused dull red except at the base and the pure white apex. *Dorsal sepal* ovate, acuminate, obtuse, 1-nerved, c. .40 cm. long, c. .25 cm. wide. *Lateral sepals* falcate at the base, ovate, acuminate, obtuse, 3-nerved, c. .43 cm. long, c. .25 cm. wide. *Petals* cuneately clawed to beyond the middle, blade ovate obtuse with irregular margins, agglutinate with the dorsal sepal in the form of a hood, white, 1-nerved, c. .40 cm. long, c. .18 cm. wide. *Lip* entire, saccate at the base, 3-nerved, cream with pure white apex, spread out c. .35 cm. long. c. .22 cm. wide, sac transversely elliptic with margins erect and appressed to the column shallow provided inside with groups of murices, blade ovate acuminate obtuse grooved provided at the base with 2 small tubercles which are produced to short inconspicuous keels not reaching the apex. *Column* cream, c. .30 cm. long, rostellum bifid grooved beneath, stigma transversely oblong much elevate beneath.

C. 3236, SFN 27359, Ulu Kagitang c. 3,500 feet, terrestrial in very young secondary forest, April, 1933.

Clemens 26911, Dallas 3,000 feet, November 2nd, 1931; 26690*a*, Dallas 3,000 feet, October 2nd, 1931.

This plant is of the affinity of *G. pusilla* Bl. and *G. reticulata* Bl. from which it differs in the hairy sepals, the lip with a shallower sac and 2 small tubercles at the base of the blade and in the longer rostellum.

Described from dried material and flowers preserved in spirit.

Goodyera procera Hook. Exot. Fl. I (1823), t. 39.

C. 3509, SFN 27470, Kamborangah c. 7,200 feet, terrestrial in light woods, June, 1933.

Clemens s.n. Kamborangah 8,000 feet, March 24, 1932; s.n. below Lumu Lumu along forest trail in moss-covered rocks, January 10th, 1932.

Distribution:—Java, Sumatra, India, China, Japan.

Goodyera hylophiloides sp. nov. Caulis basi repens, ceterum erectus. Folia c. 4, obliqua, elliptica vel elliptico-lanceolata, acuminata, acuta. Inflorescentia erecta, elongata, subdense pluriflora. Bracteæ ovatæ, longe acuminatæ, acutæ, marginibus sparse ciliatis. Sepalum dorsale late ellipticum, acutum, glabrum. Sepala lateralia majora, falcata, late ovata, subacuta. Petala e basi longe cuneato-unguiculata triangulari-ovata, subacuta, marginibus apicem versus erosulis. Labellum trilobum, lobis lateralibus erectis triangularibus obtusis, lobo intermedio ovato obtuso, intus basin prope appendicibus c. 4 erectis oblongis carnosis rugosis donatum.

Stem creeping at the base and emitting a long stout villose root from each node, remainder erect leafy, up to c. 15 cm. long, internodes c. 1 cm. long. *Leaves* c. 4, oblique, elliptic or elliptic-lanceolate, acuminate, acute, green with darker nerves, 6.33-9.33 cm. long, 1.55-2.90 cm. wide, petiole grooved up to c. 2.75 cm. long, sheath tubular with a long oblique apex up to c. 2 cm. long. *Inflorescence* erect, elongate, rather densely very many-flowered, peduncle terete glabrous provided with 3-4 large sheaths with a tubular base and many bract-like appressed sheaths below the rachis up to c. 28 cm. long, rachis shortly hairy up to c. 14.50 cm. long. *Bracts* spreading, ovate, long-acuminate, acute, margins sparingly ciliate, remainder glabrous, 1-nerved, c. .40 cm. long, c. .14 cm. wide. *Flowers* minute with the ovary at right angles to the rachis. *Sepals* glabrous, 1-nerved, the laterals keeled on the back, green tipped white.

Dorsal sepal broadly elliptic, acute, c. .19 cm. long, c. .16 cm. wide. *Lateral sepals* falcate, broadly ovate, subacute, c. .20 cm. long, c. .17 cm. wide. *Petals* agglutinate with the dorsal sepal into a hood, strongly oblique, subfalcate, cuneately clawed to well beyond the middle, blade triangular-ovate subacute with margins minutely erose, 1-nerved, c. .19 cm. long, c. .08 cm. wide, white with a greenish base. *Lip* distinctly 3-lobed, 1-nerved, ventricose, provided inside near the base with c. 4 erect oblong fleshy wrinkled appendages with truncate or inconspicuously toothed apex, yellow-green tipped white, spread out c. .23 cm. long and as wide across the side lobes, side lobes erect and embracing the column triangular obtuse, midlobe much smaller ovate obtuse with margins irregular or minutely erose. *Column* c. .13 cm. tall, abruptly dilate towards the apex, rostellum very shortly bilobed, stigma transversely oblong. *Anther* cordate, obtuse, keeled above, shortly bidentate above the base, c. .07 cm. long. *Pollinia* 2, pyriform, grooved.

This species is closely related to *G. procera* Hook. from which it is at once distinguished by the much smaller flowers, narrower petals and different lip and column. From *G. parviflora* Bl., which Dr. J. J. Smith considers to be a peloric state of *G. procera* Hook. and to which the present plant appears to be nearest, it differs *i.a.* in the distinctly 3-lobed lip with c. 4 conspicuous basal appendages.

C. 3256, SFN 26939, Main Spur of the mountain above Tenompok c. 5,200 feet, April, 1933.

Clemens 29993, Silau basin and trail to Lumu Lumu 6,000 feet, May and June, 1932; s.n. Dallas 3,000 feet, December 17th, 1931.

Described from dried material and flowers preserved in spirit.

Tropidia ? pedunculata Bl. Fl. Jav. Orch. n. ser. I (1858), 105, t. 42 E; t. 43, f. 1.

C. 3764, Near Dallas c. 3,000 feet, May, 1933.

Distribution:—Sumatra, Duizend Is., Timor Laut, Moluccas, ? N. Guinea.

Corymborchis veratrifolia Bl. Fl. Jav. Orch. 105, t. 42 E, t. 43, f. 1.

C. 3218, SFN 27310, below Lobang c. 3,800 feet, April, 1933.

Clemens 26800, Dallas 3,000 feet, November 24th, 1931.

Distribution:—Sumatra, Java, Malay Peninsula, Moluccas, N. Guinea.

Chrysoglossum reticulatum sp. nov. Pseudobulbi anguste cylindrici, apicem versus angustati, 1-folii. Folium lanceolatum, acuminatum, acutum, petiolo elongato. Inflorescentia basi pseudobulbi orta, elongata, laxe multiflora. Bracteæ late ovatæ, brevissime acuminatæ, acutæ, intus stellato-pubescentes. Sepalum dorsale lineare, obtusum, sæpe minute apiculatum. Sepala lateralia gynostemii pedem decurrentia, leviter falcata, lineari-oblanceolata, obtusa, margine antico basi leviter dilatato. Petala e basi oblique cuneata oblongo-lanceolata, obtusa, falcata. Labellum 3-lobum, apici pedis gynostemii elastice insertum, basi unguiculatum, carinis 3 sub medio lobi intermedii evanescentibus exterioribus basi rectis medio valde undulatis sub apice in formam lamellæ semiorbicularis dilatatis intermedio omnino recto apici furcato, ungui transverse oblongo plica magna pilosa utrinque, lobis lateralibus breves semiorbicularibus, lobo intermedio cuneato-obovato brevissime retuso cum apiculo minuto in sinu.

Pseudobulbs approximate or subapproximate, erect, narrowly cylindric, tapering towards the apex, covered at first with large membraneous sheaths, 3-4 cm. long, 1-leaved. *Leaf* lanceolate, acuminate, acute, rather thin in texture with 5 strong nerves, green, up to c. 22.50 cm. long, 2.40-4.50 cm. wide, petiole slender grooved up to c. 22 cm. long. *Inflorescence* erect from the base of the pseudobulb, laxly many-flowered, peduncle terete with some large membraneous sheaths at the base and 2-3 smaller sheaths at intervals above up to c. .52 cm. long, rachis up to c. 30 cm. long. *Bracts* broadly ovate, very shortly acuminate, acute, 5-nerved, stellate-pubescent inside, pale yellow with green nerves, c. .93 cm. long, c. .63 cm. wide. *Sepals and petals* keeled outside with the nerves and reticulation elevate, the sepals warty outside towards the apex, pale yellow thickly transversely spotted pale purple except at the apex. *Dorsal sepal* linear, obtuse, often minutely apiculate, distinctly but inconspicuously dilate at c. a third above the base, 3-nerved and finely reticulate with transverse nervelets, c. 2 cm. long, c. .35 cm. wide. *Lateral sepals* running down the column foot, subfalcate, linear-oblanceolate, obtuse, anterior margin a little dilate at the base, nerves similar to those of the dorsal sepal, c. 1.93 cm. long, c. .40 cm. wide. *Petals* shortly adnate to the column foot, falcate at the obliquely cuneate base, oblong-lanceolate, obtuse but often with a minute apiculus, 3-nerved with the outer nerves branched above the base and very finely reticulate with transverse nervelets, c. 1.55 cm. long, c. .60 cm. wide. *Lip* 3-lobed, mobile, clawed at the base, provided with 3 keels which

reach to below the middle of the midlobe, the outer keels not reaching the base of the lip straight and a little diverging at the base then strongly undulate and sinuous and dilate below the straight apex into a semiorbicular lamella, median keel shorter straight, apex branched rugulose, spread out c. 1.10 cm. long, c. .77 cm. wide across the side lobes; claw transversely oblong with a large hairy fold on each side, white, .25 cm. long, c. .38 cm. wide; side lobes short, forming nearly a right angle with the blade, semiorbicular, white with a short brown steak at the base, c. .25 cm. long and as broad; midlobe cuneate-obovate, apex rounded very shortly retuse with a minute tooth in the sinus, fleshy, concave with suberect margins, c. .55 cm. long, c. .50 cm. wide, pure white spotted deep lilac inside the margins and with a large transverse dark lilac spot at the base. *Column* abruptly, almost right angularly curved about the middle, sides dilate below the stigma into a minute tooth, provided below the middle with 2 approximate large roundly triangular lamellæ with the anterior margin produced at the base to the apex of the column foot, a triangular acuminate acute process on each side below the apex of the lamellæ, yellow, c. .90 cm. tall, clinandrium triangular with minutely erose margins, stigma broadly ovate. *Anther* transversely semielliptic with a short triangular tooth at the apex, a low boss above, bright yellow, c. .09 cm. long, c. .15 cm. wide. *Pollinia* 2, conic, c. .05 cm. long. *Column foot* forming an obtuse angle with the base of the column, a little incurved towards the apex, c. .30 cm. long, excavate in the lower ½ into the form of a subglobose spur which is rather flattened and grooved on the back and constricted at the mouth with the entrance very narrow between the base of the column lamellæ c. .14 cm. tall c. .18 cm. across.

A near ally of *C. ornatum* Bl. but distinct by reason of the smaller leaves, the lip with hairy basal folds and different keels and the column with different appendages, the outer 2 being tooth-like and borne below the apex of the large lamellæ which are produced outwards to the apex of the column foot where the narrow entrance of the spur-like cavity of the foot is situated. The sepals and petals are very delicately reticulate-nerved with the nerves and reticulation elevate.

C. 3314, SFN 27060, Main spur West of Tenompok Pass c. 5,000 feet, April, 1933.

Clemens s.n. Tenompok, trail to Tomis 5,400 feet, May 2nd, 1932.

Described from dried material and flowers preserved in spirit.

Gardens Bulletin, S.S.

Tainia plicata Ridl. in Journ. Linn. Soc. Bot. XXXI (1896), 285. etc.

C. 3158 Menetendok gorge c. 2700 feet, March, 1933.

Distribution:—Java.

Tainia purpureifolia sp. nov. Pseudobulbi breves, cylindrici, 1-folii. Folium ovatum vel ovato-lanceolatum, abrupte acuminatum, acutum, marginibus minutissime undulatis. Inflorescentia basi pseudobulbi orta, gracilis, laxe c. 2-flora. Bracteæ ovatæ, acutæ. Sepalum dorsale anguste oblongum, obtusum. Sepala lateralia falcata, anguste oblongo-lanceolata, obtusa. Petala falcata, oblongo-lanceolata, subacuta. Labellum e basi breviter unguiculata abrupte dilatatum, integrum, oblongum, subpanduratum, breviter acuminatum, anguste obtusum, intus super basin carinis 3 intermedia humiliore apicem attingente exterioribus brevioribus altioribus apicem versus decrescentibus.

Rhizome shortly creeping, slender. *Pseudobulbs* c. 1 cm. distant, forming an acute angle with the rhizome, cylindric, entirely concealed by a large membraneous sheath which reaches to the apex of the leaf petiole, c. 1.50 cm. long, 1-leaved. *Leaf* ovate or ovate-lanceolate, abruptly acuminate, acute, slightly rigid, margins very minutely and finely undulate, very dark green above, purple beneath, up to c. 5 cm. long, c. 2 cm. wide, petiole grooved c. 1 cm. long. *Inflorescence* from the base of the pseudobulb, slender, erect, very laxly c. 2-flowered, peduncle terete with some short tubular sheaths at the base and 1-2 longer ones above up to 18.50 cm. long, rachis up to c. 4.50 cm. long. *Bracts* appressed to the pedicel, ovate, acute, 5-nerved, lower one larger c. 1.10 cm. long. *Flowers* not widely expanded, sepals and petals keeled on the back with 2 raised nerves yellow suffused purple down the middle. *Dorsal sepal* narrowly oblong, obtuse, inconspicuously dilate at c. a third above the base, 3-nerved with the outer nerves branched from the base, c. 1.25 cm. long, c. .23 cm. wide. *Lateral sepals* adnate to the column foot, falcate, narrowly oblong-lanceolate, obtuse, 3-nerved with the outer nerves branched from the base, c. 1.25 cm. long, c. .25 cm. wide. *Petals* falcate, oblong-lanceolate, subacute, 3-nerved with the outer nerves branched from the base, c. 1.10 cm. long, c. .28 cm. wide. *Lip* entire, abruptly dilate from the shortly clawed base, oblong, subpandurate, very shortly acuminate, narrowly obtuse, provided with 3 keels from above the base the median one low reaching to the apex the laterals shorter and taller tapering towards the apex waved above the base, white with a pale purplish tinge, purple in the upper half, suffused purple beneath along the middle, the margins in

the upper ½ strongly incurved and imbricating, spread out c. 1.07 cm. long, c. .52 cm. wide. *Column* white with a large dark purple spot on the back at the apex, c. .55 cm. tall, c. .22 cm. wide, clinandrium transversely oval with inconspicuously 3-lobed margins, stigma transversely oblong retuse. *Anther* conic, grooved on the back, shortly bilobed at the base, beak short triangular truncate, cream. *Column foot* abruptly and c. rightangularly incurved, the apex ending in 2 divaricate fleshy extrorse lobules, c. .15 cm. long.

This is a close ally of *T. vegetissima* Ridl. from the Malay Peninsula but that species is larger with a broadly obovate apiculate lip with 2 very short thin basal keels and elevate nerves. Both species are characterised by the small pseudobulbs, the small leaves which are either entirely red or red-purple or with the under-surface so coloured and an entire lip. It seems to me more natural to segregate these plants under a special section for which I propose the name **Chromatophyllon.**

C. 3150, SFN 26597, Gurulau Spur c. 4,600 feet, terrestrial in moss or humus, March, 1933.

Described from dried material and flowers preserved in spirit.

Nephelaphyllum verruculosum sp. nov. Pseudobulbi breves, 1-folii. Folium obliquum, e basi truncata vel subcordata ovatum, breviter acuminatum, acutum. Inflorescentia folio subæquelonga, apici dense multiflora. Bracteæ late ovato-oblongæ, acuminatæ, acutæ. Sepala petalaque e basi reflexa. Sepalum dorsale anguste oblongo-oblanceolatum, brevissime acuminatum, acutum. Sepala lateralia longiora, angustiora, falcata, lineari-oblanceolata, acuta, cuspidata. Petala leviter falcata, oblongo-oblanceolata, obtusa vel subacuta. Labellum integrum, calcaratum; lamina elliptica, haud unguiculata, subretusa, basi pilosa, marginibus exceptis omnino puberulo-verruculosa, apicem versus lineas 3 verrucarum densarum ferens; calcar oblongum, extus sulcatum, intus carinatum faucem versus dense pilosum.

Rhizome creeping. *Pseudobulbs* up to 3 cm. distant, forming an acute angle with the rhizome, cylindric, dark olive spotted purple, c. 1.50 cm. long, 1-leaved. *Leaf* ovate from the truncate or subcordate base, shortly acuminate, acute, oblique, brown reticulate dark brown with bright green nerves above, purple beneath, 3-9 cm. long, 1.90-6.70 cm. wide, petiole grooved dark olive suffused purple towards the apex c. 1 cm. long. *Inflorescence* erect from the base

of the pseudobulb, densely many-flowered, peduncle terete with some tubular sheaths at the base and c. 2 bract-like ones at intervals above dark olive spotted purple up to c. 6.50 cm. long, rachis c. 4 cm. long. *Bracts* broadly ovate-oblong, acuminate, acute, c. .80 cm. long. *Flowers* small for the genus, widely expanded with the sepals and petals reflexed from the base green with indistinct purple nerves. *Dorsal sepal* narrowly oblong-oblanceolate, very shortly acuminate, acute, 1-nerved, c. .82 cm. long, c. .20 cm. wide. *Lateral sepals* longer and narrower, falcate, linear-oblanceolate, acute, cuspidate, 1-nerved, c. .95 cm. long. c. .17 cm. wide. *Petals* slightly falcate, oblong-oblanceolate, obtuse or subacute, 2-nerved, c. .78 cm. long, c. .20 cm. wide. *Lip* entire, spurred, 5-nerved, white with an orange median bar in the upper third, spread out c. 1.37 cm. long including the spur, c. .67 cm. wide across the middle of the blade; blade not clawed, elliptic, subretuse, densely hairy at the base, covered except near the margins with puberulous warts, provided at the apex with 3 short lines of dense warts, c. 1 cm. long; spur oblong, grooved on the back and on the front in the upper ½, keeled inside and densely hairy near the mouth, green, c. .37 cm. long, c. .23 cm. diam. *Column* winged for the whole length, the wings thin and broad a little dilate towards the rounded apex and ending in a very short tooth, white suffused purple at the apex, c. .53 cm. tall, c. .45 cm. wide, clinandrium deeply excavate transversely oblong with the posterior margin produced to a triangular lobe, rostellum very short transversely oblong, stigma large ovate. *Anther* shortly and broadly ovate, concave in front with a median keel, grooved above the base, margins elevate in front and terminating towards the base in 2 divergent bosses, lilac, c. .17 cm. long, c. .23 cm. wide. *Ovary* rather strongly 6-ribbed, furfuraceous, c. .30 cm. long, pedicel terete c. .45 cm. long.

This plant is closely related to *N. borneense* Schltr. from which it is at once distinguished by the lip which is elliptic, not at all clawed and entirely warty except near the margins and by the column which is very broadly winged throughout.

C. 3160, SFN 26607, Menetendok/Kinataki Divide c. 3,000 feet, March, 1933.

Described from dried material and flowers preserved in spirit.

Nephelaphyllum latilabre Ridl. in Stapf in Trans. Linn. Soc. Ser. iv (1894), 238.

C. 3254, SFN 26938, main spur above Tenompok c. 5,200 feet, April, 1933. *Sepals and petals green with 3 purple nerves. Lip white with radiating bright purple*

nerves, keels bright purple in the lower half deep orange in the upper half. Column base green, apex white, sides purple, 2 purple streaks inside below the stigma. Anther deep creamy yellow with a purple tip on each boss. Leaves green or brown spotted darker and with 5 dark green nerves, purple beneath, petiole and stem green spotted purple. A most beautiful plant.

Clemens 27806, below Lumu Lumu in wet mossy place c. 5,500 feet, January 10th, 1932; 29119 Lumu Lumu 6,000 feet, April 1st, 1932; s.n. Lumu Lumu 6,000 feet, March 23rd, 1932; s.n. trail to Lumu Lumu 5,500 feet, June 4th, 1932.

Distribution:—Endemic.

Mischobulbum scapigerum Schltr. in Fedde Rep. Beih. 1 (1911), 98; *Nephelaphyllum scapigerum* Hook. f. Bot. Mag. (1863), t. 5390.

C. 3420 between Kelawat and Koung c. 2,500 feet, May, 1933. *Sepals and petals deep ochre (semitransparent) veined darker. Lip lower half purple with pale yellowish margins, upper half ochre with darker nerves, keels purple in the lower half ochre in the upper half. Column pale yellow with purple base, foot purple with cream apex. Anther pale yellow.*

Clemens s.n. Dallas 3,000 feet, December 4th, 1931.

Distribution:—Endemic.

Cœlogyne cuprea Wendl. & Krzl. in Gard. Chron. ser. 3. XI (1892), 619.

C. 3075, SFN 26454, Ulu Mahandui, Penibukan Ridge, c. 4,000 feet, March, 1933.

Clemens 26518, Dallas 3,000 feet, September 21st, 1931; 28294, (mixed with *C. monilirachis* Carr) Tenompok 5,000 feet, February 9th, 1932; s.n. Tenompok 4,000 feet, August 21st, 1931; s.n. Tenompok 5,000 feet, February 19th, 1932; s.n. Tenompok 5,000 feet, October 12th, 1931.

Distribution:—Sumatra.

Cœlogyne (§ Longifoliæ) **planiscapa** Carr
var. **grandis** var. nov. A planta typica statura multo majore differt.

This new variety differs from the typical plant, with which it may also be found growing, by the much larger dimensions. *Pseudobulbs* up to 8 cm. distant and 13 cm. long. *Leaves* oblong-oblanceolate, shortly acuminate, acute, rigid, coriaceous, 33-46 cm. long, 4-7 cm. wide, petiole grooved c. 7.50 cm. long. *Inflorescence* elongate, peduncle very strongly flattened up to 30 cm. long c. .80 cm. wide at the base c. .20 cm. thick, rachis conspicuously flexuous with

internodes up to 1.50 cm. long .30 cm. diam. *Dorsal sepal* 4-4.50×1.20-1.75 cm. *Lateral sepals* 4-4.30×1.05-1.40 cm. *Petals* 3.70-4×.25-.28 cm. *Lip* when spread out 3.65-3.80×1.60-2.20 cm. across the side lobes, midlobe 2.27-2.30×1.20-1.80 cm. *Column* 2.20-2.30 cm. tall.

Sometimes there is a pair of short lamellæ near the margins at the base of the midlobe while the median nerve of the lip is sometimes elevate near the apex. On Mount Kinabalu the variety is much more common than the typical plants.

C. 3120, SFN 27464, Penibukan ridge c. 4,500 feet, March, 1933. *Sepals and petals salmon pink tinged with orange. Lip deep salmon pink. Column white tinged pale salmon;* Kamborangah c. 6,200 feet, June, 1933.

Clemens s.n. above Lumu Lumu on rocky place 6,000 feet, November 15th, 1931.

Cœlogyne kinabaluensis A. & S. Orch. VI (1920), 33.

C. 3328, SFN 27361, below Lumu Lumu c. 5,200 feet, April, 1933. *Sepals pale flesh with a yellow-green keel outside. Petals pale yellowish. Lip pale rose-salmon, keels bright ochre-yellow along the summit. Column pale pinkish salmon, darker near the whitish apex, base whitish. Anther cream with a yellow beak and pale salmon boss.*

Distribution:—Endemic.

Cœlogyne compressicaulis A. & S. Orch. VI (1920), 25.

C. 3499, SFN 27466, below Kamborangah c. 7,000 feet June, 1933. *Sepals and petals olive-yellow suffused salmon towards the base. Lip blade pale salmon-pink, side lobes bright olive-yellow, midlobe olive-yellow suffused pale salmon towards the base, keels bright salmon. Column bright salmon pink. Anther salmon.* Marei Parei c. 7,000 feet, June, 1933. *Sepals and petals pale yellow tinted salmon at the base, the sepals with a yellow-green keel outside. Lip blade pale salmon, side lobes yellow tinted orange, midlobe salmon suffused pale orange-yellow in the middle, keels salmon the laterals tipped dull orange. Column white tinted pale salmon.*

Distribution:—Endemic.

Cœlogyne (§ Longifoliæ) **tenompokensis** sp. nov. Pseudobulbi ovoidei vel oblongo-ovoidei, bifolii. Folia linearia ad lineari-oblanceolata, acuta. Inflorescentia foliis juvenilibus synantha, intervallis flores 1-2 gignens, multiflora. Bracteæ lanceolatæ, breviter acuminatæ, acutæ, caducæ. Sepala oblongo-lanceolata, acute apiculata, lateralibus angustioribus. Petala anguste subulata, longe acuminata, acuta. Labellum 3-lobum, 3-carinatum, carinis simplicibus apicem

versus dilatatis lateralibus medio fere lobi intermedii abrupte evanescentibue intermedia basin lobi intermedii attingente, lobis lateralibus brevibus latisque truncatis vel subretusis, lobo intermedio oblongo-elliptico obtuso minute papilloso marginibus undulatis.

Rhizome creeping, up to .60 cm. diam., internodes up to c. .50 cm. long. *Pseudobulbs* up to c. 2 cm. distant, ovoid or oblong-ovoid, rather strongly laterally flattened, up to 9.50 cm. long, 1.70 cm. wide, c. .50 cm. diam. when dry, 2-leaved. *Leaves* lanceolate, linear-lanceolate or linear-oblanceolate, acuminate, acute, rather thin in texture, 9.75-29 cm. long, 1.3 cm. wide, petiole grooved up to c. 4 cm. long. *Inflorescence* from between the immature leaves, elongate, very many-flowered, peduncle nude strongly laterally flattened up to c. 20 cm. long c. .40 cm. wide, rachis sinuous up to more than 50-flowered c. 35 cm. long slender with internodes .25-.80 cm. long. *Bracts* at first imbricating at the apex of the rachis then caducous, lanceolate, shortly acuminate, acute. *Flowers* opening singly or in pairs at intervals, salmon pink with the keels of the lip tipped yellow-brown. *Sepals* oblong-lanceolate, acutely apiculate, inconspicuously keeled on the back, 7-nerved, c. 2.30 cm. long, c. .55 cm. wide, the laterals subfalcate narrower. *Petals* narrowly subulate, long acuminate, very acute, 1-nerved, c. 2.10 cm. long. c. .07 cm. wide. *Lip* 3-lobed, provided with 3 simple keels which are dilate upwards the laterals terminating abruptly in the middle of the midlobe the median reaching to the base of the midlobe, spread out c. 2.05 cm. long, c. .93 cm. wide across the side lobes, side lobes short and broad with truncate or subretuse apex, midlobe oblong-elliptic minutely apiculate minutely papillose inside with undulate margins c. 1 cm. long c. .60 cm. wide. *Column* c. 1.25 cm. tall, arms inconspicuously roundly dilate from about the middle, hood with irregular margins and truncate apex, rostellum roundly triangular very shortly acuminate obtuse incurved over the stigma keeled above, stigma semi-orbicular with the anterior margin elevate and recurved. *Anther* ovate with a short keel-like boss above, beak ovate retuse, pale yellow-brown. *Ovary* conspicuously 6-ribbed,c. .40 cm. long, pedicel terete c. .90 cm. long.

C. 3270, SFN. 27501, Main Spur above Tenompok c. 5,200 feet, April, 1933.

Clemens 27191, Tenompok 5,000 feet, November ? 10th, 1931; 29126, Tenompok 5,000 feet, ? date.

This species is very closely allied to *C. compressicaulis* A. & S. from Kinabalu but is readily distinguishable by

the slender rachis and the larger flowers with very narrow subulate petals and shorter median keel of the lip.

Described from dried material and flowers preserved in spirit.

Cœlogyne (? § Longifoliæ) **obtusifolia** sp. nov. Pseudobulbi ad c. 3.70 cm. dissiti, anguste ovoidei, bifolii. Folia anguste oblonga, obtusa. Inflorescentia foliis valde juvenilibus synantha, quam folia brevior, multiflora. Bracteæ caducæ, ovatæ, acutæ. Sepalum dorsale triangulari-ovatum, acuminatum, acutum. Sepala lateralia ovato-oblonga, acuta, subsigmoidea. Petala linearia, subacuta, medio leviter constricta. Labellum 3-lobum, in lamina bicarinatum carinis apici incurvis, lobis lateralibus rotundatis, lobo intermedio subquadrato breviter bilobulo dente minuto in sinu papilloso, marginibus erosulis.

Rhizome creeping, branched, stout, covered with fleshy tubular sheaths, c. .40 cm. diam., internodes c. .50-.80 cm. long. *Pseudobulbs* up to c. 3.70 cm. distant, narrowly ovoid, up to c. 6 cm. long, 2-leaved. *Leaves* narrowly oblong, broadly obtuse, rather thin in texture, keeled beneath, 9.50-17.50 cm. long, 1-1.80 cm. wide, petiole grooved 1.50-2.50 cm. long. *Inflorescence* appearing from between the tips of the very young leaves with the peduncle nude hardly exsert, but elongating to c. 9.50 cm. in fruit, rachis subflexuous up to c. 4.50 cm. long 10-15-flowered, internodes up to c. .50 cm. long. *Bracts* caducous, ovate, acute, up to c. 1.30 cm. long. *Flowers* sub-simultaneous, opening in rapid sequence with 5-6 open together, sepals and petals transparently pale yellow with a very pale salmon tint. *Dorsal sepal* triangular-ovate, acuminate, acute, 5-nerved, c. .90 cm. long, c. .45 cm. wide. *Lateral sepals* ovate-oblong, acute, subsigmoid, 5-nerved, keeled on the back, c. .87 cm. long, c. .37 cm. wide. *Petals* linear, subacute, a little narrowed in the middle, margins irregular towards the apex, 1-nerved, c. .80 cm. long, c. .07 cm. wide. *Lip* 3-lobed, blade parallel to the column 2-keeled from above the base to the base of the midlobe with the keels fleshy incurved at the apex, pale salmon with white midlobe, the converging keels pale salmon, spread out c. .80 cm. long, c. .58 cm. wide across the rounded side lobes; midlobe right-angularly recurved, subquadrate, very shortly bilobed with a minute tooth in the sinus, papillose, margins undulate and minutely erose, inner nerves inconspicuously elevate, c. .38 cm. long and as broad. *Column* brown, not winged, c. .57 cm. tall, clinandrium transversely oblong deeply conic-excavate, rostellum ovate acuminate obtuse erect, stigma semiorbicular with elevate margins, hood transversely oblong with the upper margin c. 4-toothed, base dilate.

This is a very characteristic plant which I have provisionally included under the section *Longifoliae* though in some respects it is rather different from most other species of the section. Thus the short inflorescence lasts but a short time, the first 5-6 flowers opening together, with the remainder opening as the first series wither, the peduncle elongates in fruit, the lip differs in the lobing and in the curiously incurved keels and the column is unwinged.

C. 3149, SFN 27897, below Bundu Tuhan c. 2,000 feet, July, 1933.

Clemens 26125, Tenompok 4,000 feet, August 21, 1931.

Described from dried plants and flowers preserved in spirit.

Cœlogyne (§ Longifoliæ) **monilirachis** sp. nov. Pseudobulbi anguste elongato-ovoidei, 1-folii. Folium ellipticum, breviter acuminatum, acutum, membranaceum. Inflorescentia ex apice pseudobulbi maturi, multiflora. Bracteæ caducæ, triangulari-ovatæ, acutæ. Sepalum dorsale late oblongum, triangulari-acuminatum, brevissime apiculatum vel tridentatum, basi cymbiforme. Sepala lateralia subfalcate oblongo-lanceolata, minute apiculata. Petala lineari-lanceolata, subacuta. Labellum 3-lobum, basi saccatum, carinis 3 carnosulis integris exterioribus super basin lobi intermedii evanescentibus intermedia basin lobi intermedii attingente deinde usque ad apicem labelli in forma nervi elevati producta, lobis lateralibus brevibus latisque, lobo intermedio longe oblongo-unguiculato lamina suborbiculari retusa cum apiculo carnoso in sinu.

Rhizome creeping, c. .60 cm. diam., internodes very short up to c. .25 cm. long. *Pseudobulbs* c. 1.30 cm. distant, elongate-ovoid, up to c. 13.50 cm. long, 1-nerved. *Leaf* elliptic, shortly acuminate, acute, membraneous with c. 7 strong nerves, green often suffused red, up to c. 27 cm. long, c. 10 cm. wide, petiole grooved up to c. 1.50 cm. long. *Inflorescence* from the apex of the mature pseudobulb, elongate, more than 40-flowered, arched, peduncle nude very slender a little dilate towards the apex up to c. 17.50 cm. long, rachis dilate smooth and contracted at the nodes and resembling a necklace when fresh sinuous and wrinkled when dry up to c. 11 cm. long, internodes .20-.30 cm. long. *Bracts* at first imbricating at the apex of the rachis then caducous, triangular-ovate, acute, c. .75 cm. long, c. 1.10 cm. wide. *Flowers* opening singly or up to 4 together at long

intervals, the sepals and petals semitransparently pale salmon pink. *Dorsal sepal* broadly oblong, triangular-acuminate, very shortly apiculate or tridentate and narrowly truncate, base cymbiform, keeled outside, 7-nerved, 2.90-3.60 cm. long, 1.55-1.75 cm. wide. *Lateral sepals* subfalcately oblong-lanceolate, obtuse, minutely apiculate, keeled outside, 7-nerved, anterior margin shortly incurved above the base, base cymbiform, 2.70-3.30 cm. long, 1-1.30 cm. wide. *Petals* narrowly linear-lanceolate, subacute, grooved inside, 3-nerved, 2.85-3.15 cm. long, .23-.37 cm. wide. *Lip* 3-lobed, shortly saccate at the base, provided inside with 3 rather fleshy entire keels of which the outer terminate abruptly at the base or c. the middle of the claw of the midlobe the median reaching to the base of the midlobe thence continued as a raised nerve to the apex of the lip, pale pink with paler apex, spread out c. 2.50-2.75 cm. long, 1.55-1.68 cm. wide across the side lobes; side lobes erect, short, broad, rounded; midlobe provided with a long oblong claw, blade suborbicular retuse with a fleshy apiculus in the sinus margins minutely erose and sometimes undulate provided on each side with an oblique groove from the margin at the apex of the claw to the apiculus, 1.28-1.45 cm. long, c. .85 cm. wide. *Column* arched, pink, c. 2.15 cm. tall, arms a little roundly dilate from about the middle and ending in a very small recurved tooth, hood rounded minutely crenulate, rostellum triangular-ovate very shortly acuminate minutely retuse, stigma subquadrate with the anterior margin elevate and recurved. *Anther* subquadrate as seen from the front with a short rounded boss above, beak short triangular inconspicuously retuse, c. .28 cm. long, c. .27 cm. wide. *Pollinia* 4, obovate, flattened and grooved inside, c. .15 cm. long. *Ovary* conspicuously 6-ribbed, c. 1 cm. long, pedicel terete c. .70 cm. long.

This appears to be nearest to *C. harana* J. J. S. from Dutch West Borneo but it differs in the larger flowers and in the characters of the lip. It is best that the species of the affinity of *C. incrassata* Lndl. should be considered as members of a separate section having regard to the single large leaf and the very characteristic rachis of the inflorescence. The section could be called **Moniliformes** and comprises *C. incrassata* Lndl., *C. Naja* J. J. S., *C. harana* J. J. S., *C. crassiloba* J. J. S., *C. macroloba* J. J. S., *C. vermicularis* J. J. S., *C. kelamensis* J. J. S., and *C. tenuis*. With the exception of *C. incrassata* Lndl. which occurs in Java and Sumatra and possibly *C. vermicularis* J. J. S. which has been reported from Sumatra all the species are purely Bornean. *C. tenuis* Rolfe. is perhaps too near to *C. incrassata* Lndl.

C. 3366, SFN 27230, Tenompok c. 5,000 feet, May, 1933.

Clemens 28294, (mixed with *C. cuprea* Wendl. & Krzl.) Tenompok 5,000 feet, February, 9th 1932; 26127, Tenompok 4,000 feet, August 21 1931; 28316 Tenompok 5,000 feet, February 24th, 1932; 28454 Tenompok 5,000 feet, February 17th, 1932; 27166 Tenompok 5,000 feet, November 21st, 1931.

Described from dried material and flowers preserved in spirit.

Cœlogyne pulverula T. & B. in Nat. Tijdschr. Ned. Ind. XXIV (1863), 306.

C. 3005, SFN 26261, Koung at c. 1,250 feet altitude, February, 1933.

Clemens 26044, Dallas 3,000 feet, August 9th, 1931; 26521, Dallas 3,000 feet, September 21st, 1931.

Distribution:—Sumatra.

Cœlogyne Dayana Rchb. f. in Gard. Chron. XXI (1884), II. 826. etc.

C. 3714, near Bundu Tuhan c. 3,500 feet, August, 1933. *Sepals and petals ochre-yellow. Lip white streaked brown.*

Distribution:—Malay Peninsula.

Cœlogyne rhabdobulbon Schltr. in Notiz. Berl. viii (1921), 15.

C. 3678, near Pinansak c. 2,500 feet, August, 1933. *Sepals and petals white, the sepals suffused pale pink down the middle outside. Lip side lobes white, blade buff, midlobe white suffused deep buff at the base, keels white tipped buff. Column white suffused buff inside towards the base. Anther pale ochre. Bracts pale straw suffused dull rose-lilac towards the base.*

The keels of the lip differ a little from those of the typical plant. They are entire, thin on the blade, a little dilate, erose and crenate on the midlobe.

Distribution:—Endemic.

Cœlogyne Rochussenii De Vr. Ill. Orch. (1854), t. 2; t. 11, f. 6. etc.

C. 3008, SFN 26264, Koung c. 1,250 feet, February, 1933 (fruit).

Clemens 27616, Dallas 3,000 feet, December 15th, 1931.

Distribution:—Sumatra, Java, Malay Peninsula, Celebes, Sula Is., Philippines.

Cœlogyne venusta Rolfe in Gard. Chron. III, XXV (1904), 259.

C. 3111, SFN 26530, Mahandui river c. 3,500 feet, March, 1933. *Sepals and petals yellow or pale salmon pink. Lip white, a small yellow spot on each side at the base of the midlobe, a median yellow-brown line on middle of midlobe, keels white, 2 short outer keels on midlobe white with yellow base. Column white flushed with salmon pink especially on the back. Anther pale pinkish brown. Bracts pale pink.*

Clemens 27002, Tenompok 5,000 feet, November 7th, 1931; 27418, Dallas 3,000 feet, December 5th, 1931; 27154, between Lumu Lumu and Kamborangah 7,000 feet, November 15th, 1931; 28417, Tenompok 5,000 feet, February 13th, 1932; 29407, Tenompok 5,000 feet, May 5th; s.n. Tenompok 5,000 feet, February 19th, 1932.

Distribution:—Endemic.

Cœlogyne longibulbosa A. & S. Orch. VI (1920), 33.

C. 2479, Mahandui river c. 3,600 feet, May, 1933. *Bracts cream, brown-scurfy. Sepals pale yellow. Petals whitish. Lip blade white, side lobes yellow with white margins, midlobe white suffused pale yellow towards the apex, keels white the inner 2 double. Column white. Anther cream with brown margins.*

Distribution:—Endemic.

Cœlogyne Moultonii J. J. S. in Bull. Jard. Bot. Buit. Ser. 2, III (1912), 2; l.c. II. Sup. t. 13, f. IV.

C. 3262, SFN 27112, Tenompok near the path to Ranau c. 4,800 feet, April, 1933. *Bracts creamy yellow turning brown. Flowers hardly exsert. Sepals and petals white. Lip blade white, side lobes pale yellow with white margins, midlobe white with a large pale yellow spot at the base, 4 inner keels white tipped yellow, 2 short outer keels white, innermost 2 keels double on the blade between the side lobes. Column white. Anther cream with a brown median line, turning brown. Ovary and pedicel whitish, brown-hairy.*

Clemens 29296, Tenompok 5,000 feet, April 16th, 1932.

This differs from typical plants in that the *middle* pair of keels, *not* the *median* pair do not reach to the base of the lip.

Distribution:—Endemic.

Cœlogyne radioferens A. & S. Orch. VI (1920), 38, t. 81.

C. 3121, SFN 27458, Marei Parei c. 5,000 feet, terrestrial, March, 1933. *Sepals and petals deep ochre. Lip blade white with 4 brown lines, side lobes white veined brown with the apical margin chocolate-brown and a large brown blotch outside near the apex, midlobe chocolate-brown with white margins and base, keels white with the*

apex on the midlobe brown speckled white. Column bright yellow-brown, suffused chocolate inside. Anther whitish with margins suffused brown. Bracts green. Ovary pale yellow, densely brown-hairy.

C. 3496, SFN 27458, Kamborangah c. 7,000 feet, terrestrial, June, 1933. *Sepals and petals deep ochre-yellow. Lip blade white with 4 chocolate stripes, side lobes chocolate with white nerves and margins, midlobe chocolate with white margins and papillae and a broad transverse basal creamy white band. Common.*

Distribution:—Endemic.

Cœlogyne hirtella J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, XI (1931), 105.

C. 3122, SFN 26876, Penibukan ridge c. 4,500 feet, March, 1933. *Flowers fragrant. Sepals and petals snow white with 2 brown lines, side lobes white veined brown with white margins, and a brown blotch with yellow margins near the apex outside, midlobe white with a large bright yellow blotch which is carried onto the apex of the blade, inner keels white but bright yellow below the dark brown apex, outer keels bright yellow tipped dark brown. Column white suffused brown in side. Anther cream.* A very common plant.

Clemens 29478, Tenompok 5,000 feet, May 5th, 1932; 29638, Tenompok 5,000 feet, May 10th, 1932.

Distribution:—Endemic.

Cœlogyne (? § Elatæ) **rupicola** sp. nov. Pseudobulbi anguste ovoidei, bifolii. Folia lanceolata vel oblongo-lanceolata, acuta, plicata, rigida, basi petiolata. Inflorescentia foliis fere maturis synantha, erecta, apici pauciflora. Bracteæ oblongo-ellipticæ, obtusæ. Sepala extus breviter pilosa, carinata, oblongo-lanceolata, acuta. Petala oblanceolata, breviter apiculata. Labellum 3-lobum, lamina carinis 2 e basi ultra medium lobi intermedii abrupte terminantibus, carina brevi dimidio inferiore lobi intermedii addita, lobis lateralibus rotundatis obtusis, lobo intermedio breviter unguiculato lamina ovata triangulari-acuminata acuta.

Pseudobulbs up to c. 3 cm. distant, narrowly ovoid, grooved, base covered with the remains of tubular sheaths, up to c. 9.50 cm. long, 2-leaved. *Leaves* lanceolate or oblong-lanceolate, acute, plicate, rigid, 3-5 strong nerves beneath, 7-13 cm. long, 1-2.75 cm. wide, petiole grooved 2.30-6 cm. long. *Inflorescence* from between the nearly mature leaves, erect, stout, few-flowered, peduncle terete up to c. 28 cm. long c. .35 cm. diam. with 2-3 closely imbricating bract-like sheaths below the rachis, rachis flexuous c. 6.50 cm. long with internodes up to c. 1.60 cm. long. *Bracts* persistent,

oblong-elliptic, obtuse, margins involute about the pedicel and ovary, shortly appressed-hairy, c. 2.40 cm. long, c. 1.30 cm. wide, many-nerved. *Sepals* oblong-lanceolate, acute, keeled and shortly hairy outside the laterals strongly keeled, 7-9-nerved, white suffused pale salmon at the base, the median keel pale salmon, c. 2.70 cm. long, c. .90 cm. wide, the laterals subfalcate a little broader with a broader base. *Petals* oblanceolate, shortly apiculate, 3-nerved with the outer nerves much branched above the base, provided outside with a low grooved keel, white suffused pale salmon at the base, c. 2.77 cm. long, c. .85 cm. wide. *Lip* 3-lobed, grooved beneath for the whole length, provided on the blade between the side lobes with 2 minutely rugulose keels which rise from a basal tubercle, continue for c. .27 cm. as a thin raised nerve then abruptly thickened and double as far as the base of the midlobe and terminate abruptly above the middle of the midlobe, a short similar keel on each side in the lower half of the midlobe, blade and keels bright golden yellow, spread out c. 2.45 cm. long, c. 1.70 cm. wide, side lobes short broadly rounded white; midlobe shortly clawed with the margins of the claw minutely erose, blade ovate triangular-acuminate acute the radial nerves elevate near the minutely erose margins, white with golden yellow base, c. .80 cm. long and as broad. *Column* pale salmon with white wings and hood, c. 2 cm. tall, wings cuneately dilate from about the middle the apex rounded and sometimes provided with a minute tooth, hood transversely oblong with the upper margin minutely toothed, rostellum triangular-ovate obtuse incurved over and completely concealing the stigma, stigma quadrate with margins elevate especially the anterior which is recurved. *Anther* quadrangularly obovate, minutely retuse, a conic boss above, brown. Ovary 6-grooved, densely hairy, with the pedicel c. 2.65 cm. long, dark olive with dark brown hairs.

C. 3552, SFN 27793, Main spur above Kamborangah c. 9,000 feet, June, 1933.

Described from dried material and flowers preserved in spirit.

Cœlogyne papillosa Ridl. in Stapf in Trans. Linn. Soc. Bot. IV (1894), 238. etc.

C. 3522, SFN 27532, Main spur above Paka Paka c. 11,000 feet, June, 1933. *Sepals and petals snow white. Lip blade yellow-brown, side lobes white with yellow-brown nerves, midlobe white with a large brown spot and white papillae, keels yellow-brown tipped white. Column white suffused pale salmon along the middle of the back and pale yellow-brown inside. Anther salmon pink.*

Clemens 27172, below Paka Paka on rocks 10,000 feet, November 13th, 1931; 27862, above Paka Paka on granite crevices 12,000 feet, January 9th, 1932; 27872 Lumu Lumu 6,000 feet, January 14th, 1932; 29293, Masilau 7,000 feet, April 9th, 1932.

Distribution:—Endemic.

Cœlogyne exalata Ridl. in Journ. R. As. Soc. Str. Br. xlix (1908), 29.

Clemens s.n. Dallas 3,000 feet, January 1st, 1932.

Distribution:—Endemic.

Cœlogyne Clemensii A. & S. Orch. VI (1920), 23.

C. 3244, SFN 26988, Main spur above Tenompok c. 5,200 feet, April, 1933. *Bract salmon-brown. Ovary and pedicle salmon-pink. Sepals pale yellow suffused pale salmon. Petals paler. Lip side lobes pale yellow suffused pale salmon towards the apex, midlobe pale yellow suffused pale salmon towards the margins and apex, blade and keels pale yellow. Column white. Anther cream with brown margins.*

Kamborangah c. 7,200 feet, June, 1933. *Flowers yellow-green or bright green. Column white.*

Clemens 26952 Lumu Lumu on rocks 7,000 feet, November 12th, 1931; 27004, Tenompok 5,000 feet, November 7th 1931; 27167, (mixed with *Chelonistele amplissima* Carr) above Lumu Lumu on rocks 6,500 feet, November 15th, 1931; 27236, Dallas 3,000 feet, November 23rd, 1931; 28482, Tenompok 5,000 feet, February 19th, 1932.

Distribution:—Endemic.

var. **angustifolia** var. nov. A planta typica et foliis angustis et pedunculo longiore et floribus minoribus differt.

This variety is readily distinguishable by the very narrow leaves which are linear-oblanceolate, acuminate, conduplicate acute and measure 15-33.50 cm. long and .50-2 cm. wide with a grooved petiole up to c. 8 cm. long. *Peduncle* erect, slender, up to c. 13.50 cm .long, rachis up to c. 6-flowered 4 cm. long. *Bracts* 1.15 cm. long, .60 cm. wide. *Dorsal sepal* c. 1.25×.52 cm. *Lateral sepals* c. 1.37×.52 cm. *Petals* c. 1.17×.37 cm. *Lip* when spread out c. 1.30×.75 cm., claw c. .28 cm. long, midlobe, which has a sharp fold on each side below the apex, c. .47×.50 cm., the apex minutely apiculate. *Column* c. .80 cm. tall, hooded in the upper half with the hood rounded very shortly emarginate with an apical tooth.

C. 3091, SFN 26453, Penibukan ridge c. 4,500 feet, July, 1933. *Sepals and petals bright yellow-green or olive-green, the sepals often, the petals sometimes, suffused dull red towards the apex or all dull red. Lip similar. Column pale green or pale reddish, hood white.*

Cœlogyne plicatissima A. & S. Orch. VI (1920), 35.

C. 3516, SFN 27504, Kamborangah c. 7,200 feet, June, 1933. *Sepals deep brownish salmon. Petals olive-green suffused pale brownish salmon towards the apex. Lip similar. Column pale yellowish, hood and wings white. Anther brown.*

Below Paka Paka c. 9,500 feet, June, 1933. *Sepals greenish yellow suffused salmon-pink from above the base to the apex. Petals and lip pale yellow-green suffused* salmon-pink towards the apex. *Column whitish.*

Clemens 27185, above Lumu Lumu 7,000 feet, Novemebr, 15th, 1931; 29955, near Paka Paka on low jungle rocks 10,000 feet, May 31st, 1932; s.n. Kamborangah 8,000 feet, March 24th, 1932.

C. plicatissima A. & S. is a somewhat variable species both as to the dimensions of the flowers and as to the details of the lip. The Kamborangah plants resemble the type in the median nerve of the lip being dilate to a small triangular lamella below the apex but the flowers are much smaller. In the plants from the higher altitude, on the other hand, the flowers are a little larger than the type and the general outline of the lip is exactly typical but the median nerve is not dilate near the apex.

From what I have seen of the plants of this affinity they tend to show a rather wide range of variation. Thus *C. subintegra* J. J. S. appears to be the same as *C. exalata* Ridl. and it seems from the description quite possible that *C. rigidiformis* A. & S. is also synonymous.

These plants appear to constitute a special group characterized by the 1-leaved pseudobulbs, stiff heteranthous inflorescence with the rachis subtended by some closely imbricating bract-like sheaths, large persistent bracts involute over the base of the flower, rather fleshy flowers with the lip entire or indistinctly 3-lobed with the lower part tightly embracing the column, broad petals and the column which is abruptly dilate towards the apex into a broad rounded hood.

I propose a new section which may be called **Rigidiformes.** It will include *C. exalata* Ridl., *C. Clemensii* A. & S., *C. plicatissima* A. & S. and *C. albobrunnea* J. J. S. All these plants are endemic and no species has yet been found south of Sarawak.

Cœlogyne (§ Rigidiformes) **craticulælabris** sp. nov.

Caulis pendulus, elongatus. Pseudobulbi dissiti, ovoidei, 1-folii. Folium lanceolatum, obtusum. Inflorescentia brevis, nutans, laxe pauciflora. Bracteæ ovatæ, acutæ. Sepalum dorsale oblongo-lanceolatum, subacutum. Sepala lateralia lanceolata, subacuta. Petala obovata, subacuta. Labellum integrum, explanatum oblongo-oblanceolatum obtusum, dimidio inferiore carinis 3 humilibus medio fere carinula transversa sejunctis, dimidio superiore carinis 2 sub medio carina transversa sejunctis superne carina alta interposita. Gynostemium breve, ala apicali magna rotundata minute erosula.

Stem pendulous, stout, much branched, rooting at the base, up to c. 150 cm. long, c. .43 cm. diam., internodes up to c. 2.30 cm. long, covered at first with closely imbricating sheaths. *Pseudobulbs* on the primary stems up to c. 21 cm. distant, as close as 2.75 cm. on the branches, ovoid, more or less 4-sided, forming a very acute angle with the stem, 1.30-3 cm. long, 1-leaved. *Leaf* lanceolate, apex conduplicate obtuse, rigid, plicate, 7.50-17.50 cm. long, 1.10-3.10 cm. wide, petiole grooved .70-1.70 cm. long. *Inflorescence* from within the very young leaf, short, nodding, laxly few-flowered, peduncle nude c. 1 cm. long lengthening in fruit to c. 5 cm., with an apical bract-like involute sheath, rachis flexuous up to c. 6 cm. long, internodes up to c. .80 cm. long. *Bracts* persistent, large, involute and embracing the lower half of the flowers, broadly ovate, acute, c. 1.40 cm. long, c. 1.15 cm. wide. *Flowers* rather fleshy, hardly open, sepals and petals pale yellowish suffused salmon towards the fleshy apex. *Dorsal sepal* oblong-lanceolate, subacute, 5-nerved, c. 1.05 cm. long, c. .40 cm. wide. *Lateral sepals* subfalcate, lanceolate, subacute, 5-nerved, c. 1.15 cm. long, c. .38 cm. broad. *Petals* subfalcate, obovate, subacute, 3-nerved with the outer nerves branched from the base, c. .95 cm. long, c. .45 cm. wide. *Lip* entire, shallowly ventricose, sides erect and closely embracing the column, when spread out oblong-oblanceolate, apex obtuse very fleshy, the sides incurved in a short sharp fold at c. ¼ below the apex, provided inside in the lower ½ with 3 low simple keels joined about the middle by a transverse keel and in the upper ½ with 2 simple keels not reaching to the apex of the lip and joined below the middle by a transverse keel which gives rise to a tall median keel, c. 1.10 cm. long, c. .54 cm. wide. *Column* short, when spread out including the large hood obovate with the apex minutely erose c. .70 cm. tall, c. .57 cm. wide, rostellum ovate very shortly obtusely bilobed. *Anther* transversely elliptic, beak triangular obtusely bilobed, c. .15 cm. long, rugulose outside. *Capsule* ovoid, not winged, c. 2.70 cm. long.

This is a very distinct species of the section by reason of the pendulous habit though the characters of inflorescence and flowers leave no doubt that it belongs here.

C. 2665, SFN 27965, below Lumu Lumu c. 5,500 feet, August, 1933, Type.

Clemens 27759, Lumu Lumu to Kamborangah on logs and rocks 6,000-8,000 feet, January 7th, 1932; s.n. above Lumu Lumu 7,000 feet, January, 1932; s.n. Dallas 3,000 feet, January, 1st, 1932.

Described from dried material and flowers preserved in spirit.

CHELONISTELE Pfitz.

The discovery in Sarawak by the Oxford University expedition in 1932 and by myself on Mount Kinabalu in the following year of some very interesting species of *Chelonistele* renders it necessary to redescribe this genus on a rather different basis than that upon which it was originally proposed by Pfitzer in Engler's Pflanzenreich IV. 50. II. B. 7, 136.

Pfitzer included in his original account of the genus 2 species which obviously belong to the affinity of *Panisea* in which the bracts are persistent, namely *Ch. apiculata* (Lndl.) Pfitz. and *Ch. biflora* (Par. & Rchb. f.) Pfitz. These plants should be excluded.

Ch. crassifolia Carr, although a 2-leaved plant, has flowers entirely characteristic of *Chelonistele* proper, the floral structure resembling very closely *Ch. sulphurea* Pfitz.

In Notes Bot. Gard. Edin. xiii (1921), 188 Prof. Sir W. W. Smith described an interesting plant from Mount Kinabalu under the name *Chelonistele Keithiana* W. W. Sm. This plant, however, had already been made the type of a new genus, *Nabaluia*, by Prof. Oakes Ames in Orch. VI (1920), 70 under the name *Nabaluia Clemensii* Ames.

The three chief characters of *Nabaluia* were the bifoliate pseudobulbs, the deeply saccate claw of the lip and the 2 lamellae which take the place of the keels in *Chelonistele* and which are united transversely at the base thereby increasing the depth of the saccate claw.

The discovery, however, in Sarawak of *Ch. lamellulifera* Carr has convinced me that Prof. Sir W. W. Smith was correct in regarding *Nabaluia Clemensii* Ames as a *Chelonistele*. In *Ch. lamellulifera* Carr, which is 1-leaved and a true *Chelonistele* in habit, the claw of the lip is deeply saccate while the keels are represented by short lamellæ which are not, however, united at the base.

As well illustrated in the case of *Ch. crassifolia* Carr the character of 1- or 2-leaved pseudobulbs does not appear to be of more than specific value in this group of plants.

Chelonistele, with the exception of *Ch. perakensis* Ridl., *Ch. pusilla* Ridl. and *Ch. sulphurea* Pfitz., is entirely confined to Borneo. The following is a new description of the genus together with a key to those species known to me. I make no attempt for the present to divide the genus into sections preferring to await the result of further collecting especially in Borneo whence it is probable further interesting species will be brought to light. The plants are highly seasonal and the actual flowering periods are of short duration so that they are not very frequently encountered in flower.

Pseudobulbs 1-2-leaved. Inflorescence synanthous. Bracts caducous. Flowers simultaneous. Sepals subsimilar. Petals usually much narrower than the sepals, sometimes very narrow linear, often strongly revolute from the base. Lip 3-lobed, clawed, claw concave or saccate; keels 2 usually arising some distance above the base, short, sometimes represented by lamellæ; side lobes usually short and narrow arising above the claw; midlobe much larger, usually clawed, often with strongly dilate bilobed blade. Column conspicuously winged and hooded, the wings often abruptly dilate, stigma suborbicular excavate with conspicuously elevate margins. Pollinia 4 adhering to a viscid gland.

KEY TO THE SPECIES

Pseudobulbs 1-leaved.
- Wings of column gradually dilate.
  - Leaf shortly abruptly acuminate or apiculate.
    - Keels of lip 4 lamellæ in 2 pairs superposed, petals as broad as sepals ... ... 1. Ch. brevilamellata Carr n. comb.
    - Keels of lip strongly triangularly dilate at apex, claw very long, petals broad ... 2. Ch. unguiculata Carr
    - Keels of lip tapering from base to apex, petals narrow ... ... 3. Ch. cuneata Carr n. comb.
  - Leaf obtuse or acute, not abruptly acuminate or apiculate.
    - Leaf linear acute c. .50-.75 cm. wide. Flowers very small ... ... 4. Ch. ingloria Carr n. comb.
    - Leaf oblong obtuse very thickly fleshy, base abruptly narrowed, petiole short ... 5. Ch. pusilla Ridl.
- Wings of column abruptly dilate above the base.
  - Leaf obtuse or acute, not abruptly acuminate or apiculate.
    - Keels of lip reaching to apex of claw of midlobe ... ... 6. Ch. sulphurea Pfitz.
    - Keels of lip reaching to above base of blade of midlobe.
      - Leaf narrowly lanceolate acute. Column c. 1.17 cm. tall ... 7. Ch. kutaiensis Carr
      - Leaf oblong-oblanceolate. Column c. .75 cm. tall ... ... 8. Ch. perakensis Ridl.
  - Leaf shortly abruptly acuminate or apiculate.
    - Petals broad, ovate, acuminate. Column broadest above base ... ... 9. Ch. lurida Pfitz.

Petals narrow.
Claw of lip concave.
Column broadcast near the truncate toothed apex, midlobe c. 1.70 cm. wide ... ... 10. Ch. amplissima Carr n. comb.
Column broadest about the middle, midlobe c. .75 cm. wide ... 11. Ch. pinniloba Carr. n. comb.
Claw of lip deeply saccate.
Keels 2 short lamellas between the side lobes ... ... 12. Ch. lamellulifera Carr
Pseudobulbs 2-leaved.
Wings of column gradually dilate, keels of lip simple 13. Ch. crassifolia Carr
Wings of column abruptly dilate from about the middle.
Claw of lip concave, keels short produced at base to a short lobe ... ... 14. Ch. Richardsii Carr
Claw of lip saccate, keels 2 tall lamellæ united transversely at the base; side lobes tall, narrow 15. Ch. Clemensii Carr n. comb.

Of the above the following are new combinations:—
Ch. brevilamellata Carr (*Coelogyne brevilamellata* J.J.S.), Ch. cuneata Carr (*C. cuneata J.J.S.*), Ch. ingloria Carr (*C. ingloria J.J.S.*), Ch. amplissima Carr (*C. amplissima A. & S.*), Ch. pinniloba Carr (*C. pinniloba J.J.S.*) and Ch. Clemensii Carr (*Nabaluia Clemensii Ames*).

Chelonistele sulphurea Pfitz. in Engl. Pflanzenr. IV. 50. II. B. 7 (1907), 137.

C. 3343, SFN 27180, near Bundu Tuhan c. 4,000 feet, June, 1933; C. 3488, SFN 27443, near Bundu Tuhan c. 4,000 feet, June, 1933; C. 3580, SFN 27792, near Lumu Lumu c. 5,500 feet, July, 1933.

Clemens 29824, Tenompok 5,000 feet, June 7th, 1932; 29994, below Lumu Lumu 5,500 feet, June 8th, 1932.

Distribution:—Sumatra, Java, Borneo.

Chelonistele cuneata comb. nov. *Coelogyne cuneata* J. J. S. in Bull. Jard. Bot. Buit. Sér. 3, xi (1931), 97.

C. 3292, SFN 27028, below Lumu Lumu low down on tree trunks, common, c. 5,200 feet, October, 1933. *Bracts pale salmon. Ovary pale salmon, pedicel pale greenish. Flowers yellow, an orange or yellow-brown spot at base of column and one on each side of the sinus of the apical lobules of the lip. The peduncle of the inflorescence elongates in fruit.*

Distribution:—Endemic.

Chelonistele lurida Pfitz. in Engl. Pflanzenr. IV. 50. II. B. 7 (1907), 138. *Coelogyne lurida* L. Lind. & Cogn. in Lindenia xi (1895), 32; xii (1896), 33, t. 532: *C. sarawakensis Schltr.* in Notiz. Bot. Gart. Berl. viii (1921), 15.

C. 3518, SFN 27713, Kamborangah c. 7,200 feet, June, 1933. *Sepals and petals greenish yellow suffused pale brown in the lower half, petals tipped whitish. Lip blade salmon; side lobes white a large chocolate spot beneath at*

the sinus, base of anterior margin chocolate; midlobe claw salmon, blade white, a large yellow brown-edged spot at apex of claw and base of blade; keels salmon tipped yellow-brown. Column whitish with yellow-green keel and hood, speckled brown on the wings. Anther pale salmon.

Clemens s.n. above Lumu Lumu 7,500 feet, January 7th, 1932.

Coelogyne sarawakensis Schltr. (!) is only a state in which the leaves are much smaller than usual.

Distribution:—Endemic.

Chelonistele amplissima comb. nov. *Coelogyne amplissima* A. & S. Orch. VI (1920), 21.

C. 3755 below Kamborangah c. 7,000 feet, August, 1933. *Sepals and petals cream. Lip with 2 yellow-brown spots at the base of the side lobes and one towards the apex of the claw of the midlobe.*

Clemens 27181, above Lumu Lumu on rocks 7,000 feet, November 13th, 1931; 27167, (mixed with *Coelogyne Clemensii* A. & S.) above Lumu Lumu on rocks 6,500 feet, November 15th, 1931.

Distribution:—Endemic.

Chelonistele pinniloba comb. nov. *Coelogyne pinniloba* J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, XI (1931), 98.

C. 3763, below Kamborangah c. 6,500 feet, May, 1933. *Flowers cream suffused salmon, a brown spot on the lip.*

Distribution:—Endemic.

Chelonistele crassifolia sp. nov. Pseudobulbi approximati, anguste ovoidei vel cylindrici, bifolii. Folia oblongo-oblanceolata, obtusa, crasse carnosa, basi petiolata. Inflorescentia foliis juvenilibus synantha, brevis, c. 12-flora. Bracteæ caducæ, ovato-ellipticæ, acutæ. Flores eis sectionis Chelonistele similes. Sepala extus carinata, oblongo-ovata, obtusa, lateralibus subfalcatis. Petala lineari-lanceolata, obtusa. Labellum longe unguiculatum, medio fere trilobum, carinis 2 e medio unguis usque ad medium lobi intermedii decurrentibus, lobis lateralibus falcatis triangularibus obtusis, lobo intermedio usque ad medium unguiculato lamina transverse elliptica breviter bilobula. Gynostemii alæ super basin sensim dilatatæ apici triangulares obtusæ, ala apicali rotundata minute erosa.

Pseudobulbs approximate, narrowly ovoid or cylindric, covered at first with imbricating sheaths, wrinkled when old, 3.50-8.50 cm. long, up to c. 1 cm. diam. near the base, 2-leaved. *Leaves* oblong-oblanceolate, obtuse, thickly fleshy,

up to c. 9 cm. long, c. 1.50 cm. wide, petiole grooved 1-3.30 cm. long. *Inflorescence* appearing from between the very young leaves, erect, c. 12-flowered, peduncle slender c. 4.50 cm. long, stout and lengthening in fruit to c. 10.50 cm., dilate upwards and a little flattened towards the apex, nude, rachis c. 7.75 cm. long with internodes up to c. .70 cm. long at the base and 1 cm. long at the apex. *Bracts* caducous, ovate-elliptic, acute, many-nerved, pale flesh, c. 1.80 cm. long, c. .85 cm. wide. *Dorsal sepal* ovate-lanceolate, obtuse, apex and margins a little recurved, 5-nerved, keeled on the back, c. 1.40 cm. long, c. .55 cm. wide. *Sepals* and *petals* pale yellowish white. *Lateral sepals* oblong-ovate, obtuse, subfalcate, 5-nerved, keeled on the back, c. 1.40 cm. long, c. .53 cm. wide. *Petals* strongly reflexed above the middle, linear-lanceolate, obtuse, 1-nerved, c. 1.40 cm. long, c. .16 cm. wide. *Lip* long-clawed, 3-lobed from about the middle, provided inside with 2 thin entire keels which run from about the middle of the claw and terminate abruptly about the middle of the midlobe, pale yellowish white with a transverse semilunate yellow-brown spot at the base of the blade of the midlobe and a darker spot outside at the base of each side lobe, spread out c. 1.50 cm. long, c. 1.18 cm. wide across the side lobes; claw oblong, cuneately dilate towards the apex, 5-nerved, c. .55 cm. long, c. .35 cm. wide; side lobes falcate, triangular, obtuse, c. .33 cm. long, c. .25 cm. wide, minutely papillose towards the margins and apex; midlobe clawed to about the middle, in all c. .60 cm. long, c. .68 cm. wide, claw transversely oblong narrowed towards the apex c. .25 cm. long c. .55 cm. wide, blade transversely elliptic shortly obtusely bilobed minutely papillose towards the margins and apex with the margins subundulate and suberose c. .35 cm. long c. .68 cm. wide. *Column* keeled on the back as far as the base of the hood, pale greenish yellow, spread out c. 1.10 cm. long, c. .60 cm. wide near the apex of the wings, wings dilate gradually from above the base with the apex triangular blunt, hood broadly rounded minutely erose, rostellum rather large triangular acuminate obtuse keeled above, stigma semiorbicular with the anterior margin thin and conspicuously elevate but not recurved. *Anther* cap-shaped with a conic tubercle above which is produced towards the apex as a low keel, beak triangular obtuse, pale creamy brown, c. .15 cm. long, c. 18 cm. wide. *Capsule* trigonous with 3 tall thin keels, c. 3 cm. long.

C. 3565, SFN 28027, Main spur below Kamborangah c. 6,500 feet, taken alive to Singapore and flowering there in October, 1933. It is not uncommon along the main ridge from 5,500-8,000 feet.

Clemens 27152, above Lumu Lumu on rock 6,500 feet, November 15th, 1931; 27169, above Lumu Lumu on rock 7,000 feet, November 13th, 1931; 27365, Kamborangah on rocky ledge 8,000 feet, November 13th, 1931.

Described from dried plants and flowers preserved in spirits.

Chelonistele Clemensii comb. nov. *Chelonistele Keithiana* W. W. Sm. in Notes Bot. Gard. Edin. xiii (1921), 188! *Nabaluia Clemensii* Ames Orch. VI (1920), 71, t. 87.

C. 3474, Marei Parei c. 7,000 feet altitude, May, 1933. *Sepals yellow suffused pale brown except on the margins and median nerve which is yellow-green. Petals yellow suffused pale brown on each side of the median line. Lip base and calli pure white; side lobes white outside, pale brown inside except on the margins; midlobe white with a large pale brown spot at the base, a large yellow-brown spot below the sinus of the apical lobules and a small yellow-brown spot below the apex of the lobules on each side. Column pale brown, hood brown. Anther cream with brown margins. Sometimes the sepals are not suffused brown and the column is often white with brown margins.*

Clemens 27159, above and below Kamborangah on rocks 6,000-9,000 feet, November 13th, 1931; 27171, above Kamborangah on rocks 9,000 feet, November 15th, 1931; 27184, above Kamborangah November 15th, 1931.

Distribution:—Endemic.

Sigmatochilus kinabaluensis Rolfe in Gibbs in Journ. Linn. Soc. Bot. xlii (1914), 155, t. 3.

C. 3524, SFN 27533, Main spur between Kamborangah and Paka Paka, terrestrial on rocks under scattered dwarfed *Leptospermum* c. 9,500 feet, June, 1933. *Young leaves reddish. Inflorescence and bracts red. Pedicel and ovary red or olive suffused red. Sepals and petals creamy white. Lip white. Column bright yellow-green.*

Clemens 27153, above Paka Paka on rocks 11,500 feet, November 14th, 1931.

Distribution:—Endemic.

Pholidota pallida Lndl. in Bot. Reg. xxi (1835), sub t. 1777; Bot. Reg. xiv (1828), t. 1213 (as *Ph: imbricata*). C. 3012, Koung c. 1250 feet, August, 1933.

Clemens 26301, Dallas 3,000 feet, August 28th, 1931; 26773, Dallas 3,000 feet, September 28th, 1931; 27631, Dallas 3,000 feet, December 19th, 1931; s.n. Dallas 3,000 feet, September 24th, 1931; 26781, Dallas 3,000 feet, October 19th, 1931.

Distribution:—Sumatra, Java, Malay Peninsula, Siam, Burma, Celebes, New Guinea, Philippines, ? China, ? Australia.

Pholidota gibbosa De Vr. Ill. Orch. t. v, f. 1.

C. 3758, Tenompok c. 5,000 feet altitude, August, 1933.

Clemens 26835, Tenompok 5,000 feet, October 27th, 1931.

Distribution:—Sumatra, Java, Malay Peninsula.

Pholidota carnea Lndl. Gen. & Sp. Orch. (1830), 37.

C. 3336, SFN 28058, Upper Kinunut valley c. 4,000 feet, April, 1933.

Clemens 27398, Tenompok 5,000 feet, December 1st, 1931; 27239, Tenompok 5,000 feet, November 23rd, 1931.

Distribution:—Sumatra, Java, Malay Peninsula, Philippines.

Pholidota kinabaluensis Ames Orch. VI (1920), 68.

C. 3475, SFN 28059, Marei Parei c. 7,000 feet, May, 1933. *Flowers snow white, lip sometimes green. Anther bright green. Bracts green, darker towards the apex. The* petals are much broader than the sepals.

Distribution:—Endemic.

Pholidota Clemensii Ames Orch. VI (1920), 66.

C. 3563, SFN 27781, Main spur c. 6,000 feet, June, 1933. *Flower white, anther brown. The sac of the lip is full of nectar.*

Clemens 27805, about Paka and above in stunted jungle 11,000 feet, (? error), January 8th, 1932; s.n. Bundu Tuhan 4,000 feet, January 26th, 1932; s.n. Tenompok 5,000 feet, January 18th, 1932; 29992, falls above Lumu Lumu 7,000 feet, June 8th, 1932.

Distribution:—Endemic.

Pholidota ventricosa Rchb. f. in Bonpl. V (1857), 43.

Clemens 26022, Koung 1,500 feet, August 3rd, 1931.

Distribution:—Sumatra, Java, Philippines.

Dendrochilum conopseum Ridl. in Stapf in Trans. Linn. Soc. Bot. iv (1894), 236.

C. 3186, SFN 26759, Mahandui river c. 3,600 feet, March, 1933; C. 3412, SFN 27315, Koung c. 1,400 feet, May, 1933.

Clemens 26899 Dallas 3,000 feet, October 31st, 1931.

Distribution:—Endemic.

Dendrochilum crassum Ridl. in Journ. Linn. Soc. Bot. xxxii (1896), 288.

C. 3172, SFN 26668, Menetendok gorge c. 3,000 feet, March, 1933.

Distribution:—Malay Peninsula.

Dendrochilum (§ Platyclinis) **angustilobum** sp. nov. Pseudobulbi approximati, anguste ovoidei, 1-folii. Folium ovatum ad oblongo-oblanceolatum, obtusum. Inflorescentia pendula, elongata, multiflora. Bracteæ ovatæ, acutæ. Sepalum dorsale oblongo-lanceolatum, acutum. Sepala lateralia ovato-lanceolata, acuta. Petala oblongo-lanceolata, acuta, marginibus minute erosulis. Labellum 3-lobum, basi anguste unguiculatum, in 2/3 partibus super basin carinis 2 papillosis donatum, lobis lateralibus anguste triangularibus acutis margine postico erosulo, lobo intermedio oblongo-oblanceolato breviter apiculato. Gynostemii alæ super basin ortæ quam ala apicalis subdentata breviores.

Rhizome short, branched. *Pseudobulbs* approximate, narrowly ovoid or fusiform, smooth, shiny grey-green more or less suffused red, up to c. 5 cm. long, 1-leaved. *Leaf* ovate to oblong-oblanceolate, obtuse, thin in texture, 3.50-10 cm. long, .90-2.75 cm. wide, petiole grooved up to c. .50 cm. long, green with narrow red margins or suffused red. *Inflorescence* from the apex of the nearly mature pseudobulb, pendulous up to more than 80-flowered, pale dull red, peduncle filiform but a little dilate upwards and furnished at the apex with a few empty appressed bract-like sheaths up to c. 5.50 cm. long, rachis up to c. 35 cm. long with internodes up to c. .40 cm. long. *Bracts* much exceeding the pedicel and ovary, ovate, acute, bright flesh colour, c. .25 cm. long. *Flowers* well expanded with sepals and petals a little incurved about the middle and recurved margins 3-nerved bright yellow-green with a darker keel outside. *Dorsal sepal* oblong-lanceolate, acute, c. .53 cm. long, c. .18 cm. wide. *Lateral sepals* ovate-lanceolate, acute, subfalcate, c. .50 cm. long, c. .20 cm. wide. *Petals* oblong-lanceolate, acute, margins minutely erose, subfalcate, c. .48 cm. long, c. .17 cm. wide. *Lip* stipitate to the column foot by a narrowly oblong claw, 3-lobed, blade pale olive provided with 2 papillose keels which are incurved and contiguous at the base and reach to about the middle of the midlobe, spread out c. .37 cm. long, c. .20 cm. wide across the apex of the side lobes, often provided with 1 or more minute teeth in the sinus of the lobes; side lobes pale greenish white, rounded and forming with the blade an ovate or

suborbicular hypochile, the free part narrowly triangular acute, posterior margin minutely erose; midlobe yellow-green with 2 converging brown streaks, oblong-oblanceolate or oblong above a cuneate base, rounded and shortly apiculate at the apex, margins very minutely erose towards the apex, c. .23 cm. long, c. .09 cm. wide. *Column* greenish tipped darker, hood ovate with the apex subdentate, c. .25 cm. tall, stelidia arising from above the base linear minutely papillose towards the apex reaching to about the middle of the hood.

This is allied to *D. longirachis* Ames from which it differs in the smaller pseudobulbs and leaves and in the rather larger flowers with an unusually narrow midlobe of the lip.

C. 3233, SFN 26874, Tenompok c. 5,000 feet, April, 1933, Type.

Clemens 29412, Tenompok, trail to Tomis 5,400 feet, May 2nd, 1932; 28949, Tenompok 5,000 feet, April 4th, 1932; 29295, Tenompok 5,000 feet, April 7th, 1932; 29361, Tenompok 5,000 feet, April 22nd, 1932.

Described from dried material and flowers preserved in spirit.

Dendrochilum (§ Platyclinis) **lacteum** sp. nov. Pseudobulbi approximati, anguste ovoidei, 1-folii. Folium lanceolatum vel elliptico-lanceolatum, acutum vel obtusum. Inflorescentia multiflora. Bracteæ ovatæ, brevissime acuminatæ, acutæ. Sepalum dorsale lanceolatum, acutum. Sepala lateralia oblongo-lanceolata, acuta. Petala oblongo-lanceolata, acuta, marginibus minute erosulis. Labellum 3-lobum, inter lobos laterales carinis 2 papillosis donatum, nerva intermedia elevata, lobis lateralibus triangularibus acutis papillosis margine postico irregulariter erose-denticulato, lobo intermedio obovato vel suborbiculari obtusissimo. Gynostemii alæ super basin ortæ lanceolatæ breviter acuminatæ subacutæ, ala apicali oblonga obtusa.

Rhizome short, branched. *Pseudobulbs* approximate, narrowly ovoid, up to c. 3.85 cm. long, 1-leaved. *Leaf* lanceolate or elliptic-lanceolate, acute or obtuse, thin in texture with 7-9 strong nerves, 2.33-12.50 cm. long, 1-2.90 cm. wide, petiole grooved up to c. 1.25 cm. long. *Inflorescence* from the apex of the nearly mature pseudobulb, many-flowered, peduncle erect filiform provided at the apex with a few appressed bract-like sheaths 3-11.50 cm. long, rachis nodding up to c. 17 cm. long internodes up to c. .50 cm. long. *Bracts* nearly twice as long as pedicel and ovary, ovate, very shortly acuminate, acute, furfuraceous with many elevate nerves outside, c. .45 cm. long, c. .37 cm. wide, pale

flesh. *Sepals* and *petals* 3-nerved, keeled on the back, semitransparently cream suffused pale salmon down the middle and at the base. *Dorsal sepal* lanceolate, acute, c. .70 cm. long, c. .23 cm. wide. *Lateral sepals* oblong-lanceolate, acute, posterior margin nearly straight, anterior margin roundly dilate towards the base, c. .70 cm. long, c. .27 cm. wide. *Petals* oblong-lanceolate, acute, base narrowed, margins minutely erose, c. .67 cm. long, c. .23 cm. wide. *Lip* stipitate to the column foot by a narrowly oblong claw, 3-lobed, cream, the midlobe darker in the middle, the base of the blade between the side lobes pale salmon, blade provided with 2 papillose pale salmon keels which are incurved and contiguous at the base and reach to above the base of the midlobe often produced as elevate nerves, median nerve elevate from base to apex, spread out c. .60 cm. long, c. .52 cm. across the side lobes; side lobes triangular, acute, papillose, posterior margin irregularly erose-denticulate; midlobe obovate or suborbicular, very obtuse, c. .34 cm. long and as broad. *Column* pale salmon, hood oblong obtuse pale yellow, c. .43 cm. tall, stelidia arising from above the base and reaching to the rostellum lanceolate shortly acuminate subacute pale salmon c. .20 cm. long.

This is another ally of *D. longirachis* Ames from which it is readily distinguished by the larger flowers and very different lip.

C. 3608, SFN 27892, above Lumu Lumu c. 6,000 feet July, 1933, type.

Described from dried plants and flowers preserved in spirit.

Dendrochilum kamborangense Ames Orch. VI (1920), 57, t. 84.

C. 3622, SFN 27908, Kamborangah c. 7,500 feet altitude, July. 1933. *Sepals and petals yellow-green. Lip base yellow-green remainder brown often with paler or yellow or green margins and a pale yellow median line in the lower half. Column pale greenish yellow.*

Clemens 27860, above Lumu 7,000 feet, January 13th, 1932; 27143, above Kamborangah on trees and rocks 9,000 feet, November 13th, 1931; 27146, below Paka Paka on rocks in shelter 8,500 feet, November 12th, 1931.

Distribution:—Endemic.

Dendrochilum crassifolium Ames Orch. VI (1920), 49, t. 84.

C. 3671, SFN 28047, above Tenompok c. 5,200 feet altitude, August, 1933. *Sepals and petals pale yellow or yellow-green with a darker median nerve outside. Lip*

similar with the blade between the side lobes green and 2 pale yellow-brown streaks from the middle of the side lobes to about the middle of the midlobe. Column pale yellow, stelidia whitish.

Distribution:—Endemic.

Dendrochilum Dewindtianum W. W. Sm. in Notes Bot. Gard. Edin. viii (1915), 321; *D. perspicabile* Ames Orch. VI (1920), 62, t. 82, F. IV.

C. 3533, SFN 27562, Main spur above Lumu Lumu c. 6,500 feet, June, 1933. *Sepals and petals yellow-green. Lip pale yellowish suffused bright green down the middle, keels bright green. Column pale green, stelidia whitish, hood white.*

Clemens 27145, above Kamborangah 9,000 feet, November 15th, 1931; 27140, above Kamborangah 8,000 feet, November 15th, 1931; 27148, below Kamborangah 7,500 feet, November 12th, 1931.

Through the courtesy of the Regius Keeper, Royal Botanic Gardens, Edinburgh, who forwarded to Kew the type sheets of *D. Dewindtianum* W. W. Sm., I was enabled to make comparison with *D. perspicabile* Ames and found no specific differences.

The plant is a very common one on the main spur from 6,500 to 8,500 feet altitude. It is very variable in the leaf and flower dimensions and in the details of the lip.

Distribution:—Endemic.

Dendrochilum (§ Platyclinis) **tenompokense** sp. nov. Pseudobulbi angulatim ovoidei vel obpyriformes, 1-folii. Folium anguste lineari-lanceolatum, acutatum, acutum, rigidum. Inflorescentia folio maturo fere synantha, folium superans, multiflora. Bracteæ ovatæ, acutæ. Sepalum dorsale oblongo-lanceolatum, acutum. Sepala lateralia ovato-lanceolata, acuta. Petala latiora, e basi unguiculata elliptica, breviter acuminata, acuta. Labellum 3-lobum, intus dimidio inferiore carinis 2 basi conjunctis donatum, lobis lateralibus brevibus triangularibus obtusis margine postico minute erosulo, lobo intermedio late ovato acuto.

Rhizome creeping, branched. *Pseudobulbs* approximate to 1.25 cm. distant, forming an acute angle with the rhizome, angularly ovoid or obpyriform in the form of a buoy, minutely wrinkled, up to 1.25 cm. long, c. .85 cm. diam., 1-leaved. *Leaf* narrowly linear-lanceolate, abruptly acutate, acute, rigid, grooved above, keeled beneath, c. 7 cm. long, c. .43 cm. wide, petiole slender grooved up to c. 1.50 cm. long, *Inflorescence* appearing with the nearly mature leaf,

elongate, many-flowered, peduncle slender nude up to c. 5.50 cm. long, rachis up to c. 10 cm. long with internodes c. .27 cm. long. *Bracts* as long as or very little exceeding pedicel and ovary, ovate, acute, 3-nerved, c. .25 cm. long, c. .17 cm. wide. *Flowers* pale yellow with no markings on the lip, sepals and petals 3-nerved keeled on the back. *Dorsal sepal* oblong-lanceolate, acute, c. .50 cm. long, c. .15 cm. wide. *Lateral sepals* ovate-lanceolate acute, subfalcate, c. .50 cm. long, c. .15 cm. wide. *Petals* elliptic above the shortly clawed base, shortly acuminate, acute, c. .43 cm. long, c. .17 cm. wide. *Lip* stipitate to the column foot by a short broad claw, 3-lobed, provided on the blade between the side lobes with 2 parallel keels which are incurved and confluent at the base and reach to above the base of the midlobe, spread out c. .35 cm. long, c. .20 cm. wide below the middle of the midlobe; side lobes short, triangular, obtuse, posterior margin minutely erose; midlobe broadly ovate from the cuneate base, acute, c. .24 cm. long. *Column* c. .20 cm. tall, hood oblong, truncate, subdentate, stelidia arising from each side of the stigma lanceolate obtuse as long as or a little longer than the hood, stigma oblong with elevate margins, rostellum ovate obtuse.

This plant is a near ally of *D. Dewindtianum* W. W. Sm. with which it agrees well in habit. It is, however, a smaller plant with narrower leaves and smaller differently coloured flowers.

C. 3623, SFN 27891, Tenompok c. 5,200 feet, July, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum angustipetalum Ames Orch. VI (1920), 47, t. 83.

C. 3684, SFN 28019, Marei Parei spur c. 6,500 feet, August, 1933. *Sepals and petals pale yellow. Lip pale yellow with whitish margins, keels and elevate midnerve bright salmon pink. Column salmon pink, hood and stelidia whitish. Anther salmon.*

Distribution:—Endemic.

Dendrochilum imbricatum Ames Orch. VI (1920), 54, t. 8, f. 1.

C. 3653, SFN 27998, Tenompok c. 5,000 feet, August, 1933. *Pseudobulbs dark olive. Bracts brown with a dull pink tinge and paler apical margin. Sepals and petals pale yellow suffused pale salmon at the base and more or less suffused pale yellow-brown towards the apex. Lip blade pale yellow-green; side lobes pale yellow, apex yellow-brown, posterior margin brown; midlobe brown with pale yellow margins and median line.*

Distribution:—Endemic.

Dendrochilum (§ Platyclinis) **acuiferum** sp. nov. Pseudobulbi subapproximati, anguste ovoidei, 1-folii. Folium anguste oblongo-lanceolatum vel oblongo-oblanceolatum, sub apice acuto angustatum. Inflorescentia folio bene evoluto fere synantha, gracilis, multiflora. Bracteæ ovatæ, acutæ. Sepala lanceolata, acuta. Petala elliptica vel lanceolata, acuta, marginibus dimidio superiore minute erosulis. Labellum 3-lobum, dimidio inferiore carinis 2 semiovatis basi carina transversa sejunctis donatum, lobis lateralibus brevibus rotundatis vel subtruncatis lobo intermedio late ovato vel transverse elliptico breviter acuminato acuto, marginibus minute erosulis.

Rhizome creeping, branched. *Pseudobulbs* subapproximate, forming an acute angle with the rhizome, narrowly ovoid, minutely wrinkled, up to c. 4 cm. long, 1-leaved. *Leaf* narrowly oblong-lanceolate or oblong-oblanceolate, narrowed distinctly below the acute apex, up to c. 11 cm. long, c. 1.30 wide, petiole slender grooved up to c. 2.50 cm. long. *Inflorescence* from the apex of the young pseudobulb with the leaf nearly fully expanded, slender, longer than the leaf, laxly up to c. 17-flowered, peduncle filiform provided at the apex with an appressed bract-like sheath up to c. 14 cm. long, rachis stouter nodding up to c. 8 cm. long. *Bracts* nearly twice as long as the pedicel and ovary, broadly ovate, acute, keeled and furfuraceous outside, margins minutely erose, c. .37 cm. long, c. .33 cm. wide. *Sepals* and *petals* keeled outside, 3-nerved, pale yellow or pale salmon. *Sepals* lanceolate, acute, the laterals subfalcate, c. .65 cm. long, c. .23 cm. wide *Petals* elliptic or lanceolate, acute, margins minutely erose in the upper ½, c. .57 cm. long, c. .20 cm. wide. *Lip* adnate to the column foot by a very short broad cuneate claw, 3-lobed, provided inside in the lower ½ with 2 semiovate keels which are joined by a transverse keel at the base, median nerve elevate, pale yellow suffused very pale salmon towards the apex and with a deep salmon basal spot, spread out c. .47 cm. long, c. .37 cm. wide across the midlobe; side lobes very short, rounded or subtruncate, margins minutely erose; midlobe ovate or transversely elliptic, shortly acuminate, acute, c. .35 cm. long, nerves inconspicuously elevate, margins minutely erose. *Column* c. .17 cm. tall, hood short triangular with a broadly rounded or subtruncate apex, stelidia basal very slender terete reaching to the rostellum, stigma ovate with anterior margin elevate.

This species is a close ally of *D. stachyodes* J.J.S. with which it agrees in habit; both plants are terrestrial and may

be found growing together. In *D. acuiferum*, however, the inflorescence is rather more lax and the colour of the flowers is rather different. But the main difference is to be found in the column. In *D. stachyodes* J.J.S. this is much shorter and the stelidia, where they are visible at all, occur only as very minute basal teeth.

C. 3550, SFN 27645, near Paka Paka c. 10,000 feet, terrestrial under dwarf *Leptospermum* or in the open, June, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum stachyodes J.J.S. in Rec. Trav. Bot. Neerl. 1 (1904), 77.

C. 3521, SFN 27531, near Paka Paka c. 10,000 feet, terrestrial under *Leptospermum* or in the open, June, 1933. *Whole flower creamy white. Column salmon pink.*

Clemens 27870, above Kamborangah 9,000 feet, January 8th, 1932; 29120, Kamborangah 8,000 feet, March 24th, 1932; 27141, above Paka Paka on sunny side of rocks on granite slope 11,000 feet, November 14th, 1931.

Distribution:—Endemic.

Dendrochilum grandiflorum J.J.S. in Rec. Trav. Bot. Neerl. 1 (1904), 66.

C. 3476, SFN 27430, Kamborangah c. 7,000 feet, June, 1933. *Sepals and petals flesh. Lip deep flesh with darker keels. Column dark olive with pink base and stelidia, rostellum yellow. Anther cream suffused rose towards the crown.*

Clemens 27866, between Kamborangah and Paka on rocks and trees 9,000 feet, January 8th, 1932; 27867, above Kamborangah 8,500 feet, January 8th, 1932: 29128, between Kamborangah and Paka 9,000 feet, March 24th, 1932; 27142, above Kamborangah on tree trunks 9,000 feet, November 13th, 1931; 27149, above Kamborangah on rocks and tree trunks 9,000 feet, November 12th, 1931.

Distribution:—Endemic.

Dendrochilum (§ Platyclinis) **planiscapum** sp. nov. Pseudobulbi subapproximati, ovoidei, 1-folii. Folium lineare, acutum. Inflorescentia folio bene evoluto fere synantha, multiflora. Bracteæ subulatæ. Sepalum dorsale anguste oblongo-lanceolatum, acutum. Sepala lateralia anguste ovato-lanceolata, acuta. Petala oblongo-oblanceolata, acuta. Labellum valde inconspicue 3-lobum, inter lobos laterales carinis 2 donatum, lobis lateralibus vix rotundatis, lobo intermedio triangulari-ovato obtuso nervis inconspicue elevatis.

Rhizome stout, shortly creeping, branched. *Pseudobulbs* subapproximate, ovoid, wrinkled, up to c. 2.70 cm. long, c. 1.20 cm. diam., 1-leaved. *Leaf* linear, apex conduplicate acute, grooved above, keeled beneath, rigid, up to c. 30 cm. long, c. .85 cm. wide, petiole grooved up to c. 7 cm. long. *Inflorescence* from the apex of the pseudobulb with the leaf almost fully expanded, stout, many-flowered, peduncle nude strongly laterally flattened up to c. 16 cm. long provided at the apex with a bract-like sheath c. 1.50 cm. long. *Bracts* about twice as long as the pedicel and ovary, subulate, margins involute, lower ones longest up to c. 1 cm. long. *Sepals* 3-nerved, bright yellow-green or citron with a median green keel on the back, the laterals suffused red at the base. *Dorsal sepal* narrowly oblong-lanceolate, acute, c. .85 cm. long, c. .18 cm. wide. *Lateral sepals* narrowly ovate-lanceolate, acute, margins revolute, c. .68 cm. long, c. .18 cm. wide. *Petals* oblong-oblanceolate, acute, falcate, 3-nerved, margins strongly revolute, keeled outside, grooved inside, bright citron, c. .68 cm. long, c. .17 cm. wide. *Lip* strongly involute in the upper half, very inconspicuously 3-lobed, brown, provided inside to about the middle with 2 keels which are produced to near the apex as raised nerves, median nerve elevate on the midlobe, spread out c. .48 cm. long, c. .20 cm. wide, side lobes entire very inconspicuous scarcely rounded, midlobe narrowly triangular-ovate obtuse. *Column* pale yellow, hood and stelidia whitish the stelidia suffused pale salmon, in all c. .28 cm. tall, hood triangular apex truncate 2-3-toothed, stelidia arising on each side of the stigma broadly lanceolate acuminate acute longer than the hood, rostellum ovate obtuse, stigma oblong with elevate brown margins. *Anther* yellow-green.

This is an ally of *D. simile* Bl., *D. odoratum* J. J. S., *D. lineare* Pfitz. etc. It is readily distinguished by the long very narrow leaf and the greatly flattened peduncle of the inflorescence.

C. 3663, SFN 28020, Tenompok c. 4,800 feet, August, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Platyclinis) **graminoides** sp. nov. Pseudobulbi approximati, ovoidei vel oblongo-ovoidei, 1-folii. Folium anguste lineare, oblique obtusum. Inflorescentia folio maturo synantha, gracillima, multiflora. Bracteæ ovatæ, acutæ. Sepalum dorsale ellipticolanceolatum, acutum. Sepala lateralia falcata, lanceolata, acuta. Petala falcata e basi angusta late lanceolata acuta, marginibus minute erosulis. Labellum

inconspicue 3-lobum, marginibus erosulis, inter lobos laterales carinis 2 brevibus basi carina transversa sejunctis donatum, lobis lateralibus vix rotundatis, lobo intermedio elliptico subacuto concavo.

Rhizome shortly creeping, branched. *Pseudobulbs* densely aggregate, ovoid or oblong-ovoid, minutely wrinkled, up to c. 1.10 cm. long, c. .45 cm. diam., 1-leaved. *Leaf* narrowly linear, grassy, apex obliquely obtuse, thin in texture, up to c. 13.50 cm. long, c. .20 cm. wide, petiole slender grooved up to c. 3 cm. long. *Inflorescence* from the apex of the pseudobulb with the leaf about fully expanded, very slender, many-flowered, peduncle filiform nude provided at the apex with some appressed closely imbricating bract-like sheaths up to c. 8 cm. long, rachis nodding flexuous a little thickened up to c. 6 cm. long, with internodes c. .23 cm. long. *Bracts* twice as long as the pedical and ovary, ovate, acute, c. .20 cm. long. *Flowers* yellow, sepals and petals 3-nerved. *Dorsal sepal* elliptic-lanceolate acute, c. .43 cm. long, c. .10 cm. wide. *Lateral sepals* falcate, lanceolate, acute, c. .40 cm. long, c. .10 cm. wide. *Petals* broadly lanceolate from the narrow base, acute, falcate, margins minutely erose, c. .37 cm. long, c. .12 cm. wide. *Lip* inconspicuously 3-lobed, margins minutely erose, 3-nerved, provided inside between the side lobes with 2 short keels which are joined at the base by a transverse keel, spread out c. .30 cm. long, c. .10 cm. wide, side lobes scarcely rounded, midlobe elliptic subacute concave. *Column* c. .15 cm. tall, hood cuneate with roundly triangular obtuse apex, stelidia arising from below the stigma short slender subulate reaching to the base of the hood c. .05 cm. long, rostellum large ovate obtuse, stigma ovate with elevate margins. *Capsule* obovoid, crowned with the dried remains of the flower, c. .45 cm. long, c. .27 cm. diam.

This is another plant of the same affinity as the preceding. It is readily distinguished by the narrow grassy leaves and very slender inflorescence.

C. 3680, SFN 28006, near Pinansak c. 3,000 feet, flowered at Singapore in November, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Platyclinis) **Gibbsiæ** Rolfe in Gibbs in Journ. Linn. Soc. Bot. xlii (1914), 147; *D. kinabaluense* Rolfe l. c. 148; *D. quinquelobum* Ames Orch. VI (1920), 63, t. 82, F. 2.

C. 3134, SFN 26745, Mahandui river c. 3,500 feet, March, 1933. *Sepals and petals pale green. Lip lower half dark brown with a paler median line, side lobes and midlobe pale green. Column green, hood and stelidia white;*

C. 3620, SFN 27884, near Bundu Tuhan c. 3,000 feet, July 1933. *Flower green or yellow-green, lip with 2 brown spots about the middle. Anther cream;* C. 3669, SFN 27970, Marei Parei c. 5,000 feet, August, 1933. *Flowers transparently pale yellow, lip with a bright citron or yellow-brown spot in the sinus of the basal lobules. Stelidia whitish;* C. 3709, SFN 28034, Kadamaian river c. 6,000 feet altitude, flowered in Singapore in October, 1933. *Sepals and petals yellow. Lip yellow with 2 brown spots one at the base of each median lobe. Column yellow-green.*

Clemens 26784, Dallas 3,000 feet, October 18th, 1931; s.n. Dallas 3,000 feet, October 12th 1931; 26841, Dallas 3,000 feet, October 28th, 1931; 26930, Dallas 3,000 feet, November 3rd, 1931; 29235, Tenompok 5,000 feet, April 14th, 1932.

Critical examination of the large collections made and careful dissections and drawings of the type material have compelled me to regard *D. kinabaluense* Rolfe and *D. quinquelobum* Ames as synonyms of *D. Gibbsiae* Rolfe. Careful drawings of Rolfe's species show nothing more than slight differences in the size of the flowers, the structure being identical. *D. quinquelobum* Ames differed from Rolfe's plants in the larger strongly recurved median lobes of the lip but the present collection includes every gradation from short straight lobes upwards.

There seems to be no question but that we have to deal with a plant which exhibits an amount of variation most unusual in the genus and this applies not only vegetatively but also to the dimensions and shape of the parts of the flower. Thus C. 3620 has consistently very much larger leaves than any of the examples hitherto seen by me yet the flowers are smaller even than those of *D. kinabaluense* Rolfe with broader sepals and petals and short broad straight median lobes of the lip. Moreover the small transverse keel within the large horse-shoe keel which occurs in the type plants of all the species is here lacking, as also in C. 3134.

Distribution:—Endemic.

Dendrochilum exasperatum Ames Orch. VI (1920), 50.

C. 3668, SFN 28029, Tenompok c. 5,200 feet, altitude, August, 1933. *Flowers pale greenish yellow, lip with a triangular yellow-brown spot at the base of each median lobule, apical lobule a very long cusp;* C. 3718, SFN 28049, near Tenompok c. 5,000 feet altitude, August, 1933. *Sepals and petals cream. Lip cream with 2 brown spots.*

Clemens 26784A, Dallas 3,000 feet, October 18th, 1931; 27256, Dallas 3,000 feet, November 20, 1931.

Distribution:—Endemic.

Dendrochilum Haslamii Ames Orch. VI (1920), 53, t. 85.

C. 3528, SFN 27864, between Kamborangah and Paka Paka c. 9,500 feet, June, 1933. *Sepals and petals pale creamy yellow. Lip blade brown, side and midlobes bright brown, apical cusp creamy yellow. Column olive-brown, stelidia pale brown tipped yellow-brown.*

Clemens s.n. Kamborangah 8,000 feet, March 24th, 1932.

Distribution:—Endemic.

Dendrochilum corrugatum J. J. S. in Rec. Trav. Bot. Neerl. 1 (1904), 65.

C. 3675, SFN 28004, Kadamaian river c. 6,500 feet, August, 1933. *Flowers pale yellow, base of lip greenish yellow.*

Distribution:—Endemic.

Dendrochilum lancilabium Ames Orch, VI (1920), 58, t. 83.

C. 3752, Kamborangah c. 7,500 feet, terrestrial in moss and locally abundant, October, 1933. *Flowers pale lemon.*

Clemens s.n. above Lumu 7,000 feet, January 10th, 1932.

Distribution:—Endemic.

Dendrochilum fimbriatum Ames Orch. VI (1920), 51,

C. 3128, SFN 27428, Marei Parei c. 5,500 feet, March, 1933. *Pseudobulb green suffused red or all red. Inflorescence red. Bracts red. Sepals and petals creamy white. Lip yellow-green. Column deep pink. Anther yellow.*

Distribution:—Endemic.

This and the following six species form, together with *D. microscopicum* J. J. S., a well-marked group for which I propose a new section should be created. This could be called **Eurybrachion** and is characterized by the short stout column with very short rounded or inconspicuously lobed hood and comparatively large broad stelidia which are basal and about equal the column in length. The lip is entire and often broader than long and is provided with a conspicuous horse-shoe shaped keel. The face of the column is much dilate below the stigma which is thus conspicuously raised.

The following is a key to the species of the section which seems to be entirely confined to Borneo and *D. microscopicum* J. J. S., which is the only species known to occur

outside British North Borneo. The species are all montane at altitudes of 5,000 to 11,500 feet:—

Lip broader than long	
Margins fimbriate	1. D. fimbriatum Ames
Margins entire	
Blade subapiculate c. .30×.44 cm.	2. D. transversum Carr
Blade shallowly retuse c. .18×.27 cm.	3. D. scriptum Carr
Lip as long as or longer than broad	
Blade ovate c. .64×.58 cm.	4. D. alpinum Carr
Blade ovate c. .26–.35×.27–.30 cm.	5. D. pterogyne Carr
Blade oblong-obovate, shortly apiculate c. .20×.15 cm.	6. D. alatum Ames
Blade oblong, base cuneate, apex long apiculate c. .20×.10 cm.	7. D. joclemensii Ames
Blade cuneate, bilobed, c. .05 cm. long and as broad	8. D. microscopicum J. J. S.

Dendrochilum (§ Eurybrachion) **transversum** sp. nov. Pseudobulbi approximati, anguste cylindrici, 1-folii. Folium lineari-lanceolatum vel lineari-oblanceolatum, breviter acutatum, cuspidatum. Inflorescentia synantha, multiflora. Bracteæ ovatæ. Sepala lanceolata, acuta, lateralibus falcatis. Petala oblongo-oblanceolata, acuta. Labellum integrum, transverse oblongum, subapiculatum, carina late hippocrepidiformi apicem haud attingente donatum.

Rhizome shortly creeping, branched. *Pseudobulbs* approximate, narrowly cylindric, minutely wrinkled, up to c. 4.50 cm. long, c. .65 cm. diam., green more or less suffused red or all red, 1-leaved. *Leaf* linear-lanceolate or linear-oblanceolate, abruptly narrowed below the apex, apex shortly acutate cuspidate, rather thin in texture, keeled beneath, 9-23 cm. long, up to c. 1.20 cm. wide, petiole slender grooved up to c. 4 cm. long. *Inflorescence* from the apex of the pseudobulb with the young leaf not fully expanded, many-flowered, peduncle very slender nude with 2-3 appressed bract-like sheaths at the apex up to c. 20 cm. long, rachis up to c. 9 cm. long. *Bracts* ovate, as long as the pedicel and ovary, c. .28 cm. long. *Sepals* rose, broadly lanceolate, acute, 3-nerved, the laterals falcate, .47-.55 cm. long, c. .25 cm. wide. *Petals* oblong-oblanceolate, acute,

3-nerved, rose, c. .50 cm. long, c. .17 cm. wide. *Lip* entire, transversely oblong, subapiculate, margins recurved in the upper half, provided inside with a tall broadly horse-shoe shaped keel which encloses a concave area and which does not reach to the apex of the lip, spread out c. .30 cm. long, c. .44 cm. wide, deep ochre with darker apex and margins. *Column* pinkish brown, c. .17 cm. tall, hood very short a little dilate entire and transversely elliptic or with apex inconspicuously dilate and sub-3-lobed, stelidia basal as long and about as broad as the column oblong, acutate, obtuse, ochre tipped dark ochre-brown, rostellum ovate, obtuse, stigma excavate suborbicular with tall elevate margins.

C. 3477, SFN 27431, Marei Parei c. 7,000 feet, May, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Eurybrachion) **scriptum** sp. nov. Pseudobulbi c. 1 cm. dissiti, anguste ovoidei, 1-folii. Folium anguste lanceolatum, breviter acutatum, obtusum vel minute cuspidatum. Inflorescentia synantha, multiflora. Bracteæ ovatæ, quam ovarium longiores. Sepalum dorsale ellipticum, obtusum. Sepala lateralia ovata, obtusa, falcata. Petala oblonga, obtusa. Labellum integrum, transverse oblongum, leviter retusum, intus in 2/3 partibus inferioribus carina magna M-formiter sub apice pulvino humili donatum.

Rhizome shortly creeping, branched, densely covered with dry sheaths. *Pseudobulbs* c. 1 cm. distant, forming an acute angle with the rhizome, narrowly ovoid, minutely wrinkled, up to c. 2.50 cm. long, c. .65 cm. diam., red, 1-leaved. *Leaf* narrowly lanceolate, shortly acutate, obtuse or minutely cuspidate, rigid, keeled beneath, up to more than 13 cm. long, c. 1.10 cm. wide, petiole grooved up to c. 3 cm. long. *Inflorescence* from the apex of the pseudobulb with the leaf nearly mature, many-flowered, peduncle nude up to c. 6 cm. long, rachis c. 8.25 cm. long, with internodes c. .25 cm. long. *Bracts* much longer than the pedicel and ovary, ovate, c. .35 cm. long. *Sepals* ochre tipped brownish salmon with a salmon median line outside, 3-nerved, obtuse, the dorsal elliptic, the laterals falcate ovate, c. .30 cm. long, c. .20 cm. wide, laterals a little wider. *Petals* oblong, obtuse, 3-nerved, ochre, c. .30 cm. long, c. .17 cm. wide. *Lip* transversely oblong, shallowly retuse, provided inside in the lower 2/3 with a large M-shaped keel and below the apex with a low fleshy keeled cushion, reddish brown, keels paler, margins ochre, spread out c. .18 cm. long, c. .27 cm. wide. *Column* dark reddish brown, c. .10 cm. tall, hood very short triangular obtuse, face much swollen below the stigma, stelidia basal as long as the column broadly elliptic.

C. 3597, Main spur above Kamborangah, c. 8,500 feet, July, 1933.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Eurybrachion) **alpinum** sp. nov. Pseudobulbi subapproximati, ovoidei, 1-folii. Folium anguste lanceolatum, apice conduplicato acuto. Inflorescentia synantha, multiflora. Bracteæ ovatæ. Sepalum dorsale oblongum, obtusum. Sepala lateralia ovato-oblonga, obtusa. Petala oblonga, obtusa. Labellum late ovatum, subacutum, intus per nervam intermediam elevatum, carinis 2 altis curvis paullo extrorsis basi incrassatione humili sejunctis.

Rhizome shortly creeping, branched. *Pseudobulbs* up to c. 1 cm. distant, ovoid, many-grooved, minutely wrinkled, up to c. 2.70 cm. long, c. 1 cm. diam., green, golden yellow or red, 1-leaved. *Leaf* narrowly lanceolate, narrowed above the middle, apex conduplicate acute, rigid, 7-13 cm. long, .80-1.50 cm. wide, petiole grooved up to c. 3 cm. long. *Inflorescence* from the apex of the young pseudobulb with the leaf nearly fully expanded, many-flowered, peduncle slender terete a ltle dilate upwards provided at the apex with 1-2 appressed imbricating bract-like sheaths up to c. 10 cm. long, with internodes c. .60 cm. long. *Bracts* much longer than the pedicel and ovary, ovate, acute, margins minutely erose towards the apex, densely furfuraceous outside with many elevate nerves, c. .50 cm. long. *Sepals* and *petals* 3-nerved, yellow suffused salmon or all salmon pink. *Dorsal sepal* oblong, obtuse, sometimes minutely apiculate, c. .78 cm. long, c. .44 cm. wide, *Lateral sepals* ovate-oblong, obtuse, sometimes minutely apiculate, keeled outside towards the apex, c. .78 cm. long, c. .40 cm. wide. *Petals* oblong, obtuse, c. .78 cm. long, c. .38 cm. wide. *Lip* entire, broadly ovate, subacute, rather incurved above the middle, elevate along the median nerve, provided in lower $\frac{3}{4}$ with 2 tall curved suberect or rather extrorse keels which form with the median incrassation 2 grooves and which are joined at the base by a low cushion, salmon pink with brownish salmon median line, keels and apex, c. .64 cm. long, c. .58 cm. wide. *Column* deep salmon pink, c. .20 cm. tall, the face much dilate below the transversely oblong stigma, hood very short dilate inconspicuously 3-lobed with the lobes triangular obtuse, stelidia basal as tall and nearly as broad as the column oblong-oblanceolate obtuse brown. *Capsule* obovoid with 3 rounded keels, c. 1.60 cm. long, c. .70 cm. diam.

This is the largest flowered species of the section.

C. 3545, SFN 27624, below Sayat Sayat c. 11,500 feet, June, 1933, growing on the sides of granite rocks and more or less sheltered by stunted trees.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Eurybrachion) **pterogyne** sp. nov. Pseudobulbi subapproximati, ovoidei, 1-folii. Folium lineari-lanceolatum, apice conduplicato acuto. Inflorescentia synantha, gracillima, c. 15-flora. Bracteæ ovatæ, acutæ. Sepalum dorsale ovato-ellipticum, breviter apiculatum. Sepala lateralia falcata, ovata, breviter apiculata. Petala elliptica, breviter apiculata. Labellum integrum ovale, minute apiculatum, carina magna hippocrepidiformi extrorsa saepe intus super basin carinis 2 connatis brevioribus additis, nervis elevatis.

Rhizome shortly creeping, much branched. *Pseudobulbs* approximate to 1 cm. distant, ovoid, minutely wrinkled, green or red, up to c. 2.20 cm. long, c. .75 cm. diam., 1-leaved. *Leaf* linear-lanceolate, apex conduplicate acute, rigid, 2.50-10.50 cm. long, c. .30-.80 cm. wide, petiole grooved up to c. 2.50 cm. long. *Inflorescence* from the apex of the young pseudobulb with the leaf nearly fully expanded, c. 10-15-flowered, peduncle filiform provided at the apex with 1-2 appressed bract-like sheaths up to c. 8 cm. long, rachis thickened flexuous forming an obtuse angle with the peduncle more or less quadrangular when dry up to c. 4.50 cm. long. *Bracts* longer than the pedicel and ovary, ovate, acute, furfuraceous outside with many raised nerves, c. .33 cm. long. *Sepals* and *petals* 3-nerved, shortly apiculate, concave, a little incurved above the middle, the lateral sepals keeled outside towards the apex, pale yellow tinted pale salmon or salmon pink with darker apex and median line. *Dorsal sepal* ovate-elliptic, c. .50 cm. long, c. .25 cm. wide. *Lateral sepals* falcate, ovate, c. .48 cm. long, c. .27 cm. wide. *Petals* elliptic, c. .47 cm. long, c. .25 cm. wide. *Lip* entire, oval, minutely apiculate, margins sometimes strongly recurved in the upper ½, provided in the lower ¾ with 2 tall curved extrorse keels which are incurved and united at the base to form a horse-shoe often produced inside above the base as 2 short adnate extrorse keels, nerves elevate from the apex of the keels almost to the apex of the lip, yellow with bright salmon pink base and keels or all salmon pink with base and keels darker, c. .26-.35 cm. long, c. .27-.30 cm. wide. *Column* salmon pink, c. .20 cm. long, face strongly elevate below the stigma, hood very short a little dilate very inconspicuously 3-lobed, stelidia basal about as long and as broad as the column oblong-ovate obtuse. *Capsule* oblong-obovoid, provided with 3 low keels, c. 1.10 cm. long.

C. 3541, SFN 27597, Paka Paka abundant on trees c. 10,200 feet, June, 1933; C. 3548, SFN 27635, Paka Paka c. 10,200 feet, June, 1933. *Sepals and petals salmon pink. Lip*

brown with salmon pink margins. Column deep salmon pink. Anther cream. Pseudobulbs red. This number differs from the type in that the lip is ovate and the leaves rather broader. After finding one specimen I was able to distinguish it from typical plants quite easily from the ground and at first considered that I had to do with 2 distinct species. For the present, however, I think it best included here.

Clemens 27864, Paka Paka 11,000 feet, January 8th, 1932.

Described from dried plants and flowers preserved in spirit.

Dendrochilum (§ Eurybrachion) **alatum** Ames Orch. VI (1920), 45, t. 82, f. 3.

C. 3715, below Kamborangah c. 6,500 feet, October, 1933. *Pseudobulbs deep red. Leaf green often with reddish margins and reddish nerves beneath, petiole olive suffused dull red. Sepals and petals transparently pale yellow with a yellow-green median nerve. Lip pale yellow with bright citron nerves and keels, base and base of keels bright salmon. Column bright salmon pink, rostellum whitish, stelidia and hood whitish speckled red at the apex. Anther cream. Ovary and pedicel salmon.*

Distribution:—Endemic.

Dendrochilum (§ Eurybrachion) **Joclemensii** Ames Orch. VI (1920), 55, t. 83.

C. 3710, Kadamaian river c. 6,500 feet, October, 1933. *Flowers pale yellow, base of keel of lip pale salmon.*

Distribution:—Endemic.

Claderia viridiflora Hook f. Fl. Brit. Ind. V (1890), 810; Ic. Pl. xxi (1892), t. 2083.

C. 3423, SFN 27339, Kokohitan hill c. 2,500 feet, May, 1933.

Distribution:—Sumatra, Malay Peninsula.

Dilochia Cantleyi Ridl. in Journ. Linn. Soc. xxxii (1896), 332.

C. 3129, Marei Parei c. 5,500 feet, August, 1933. *Sepals creamy white. Petals white. Lip yellow-ochre speckled purple along the middle. Column pale greenish white.*

Distribution:—Sumatra, Malay Peninsula.

Dilochia Wallichii Lndl. Gen. & Sp. Orch. (1830), 38.

C. 3422, SFN 27338, Kokohitan Hill c. 2,500 feet, May, 1933.

Clemens 27615, Dallas c. 3,000 feet, December 15th, 1931; 27728, Dallas c. 3,000 feet, December 31st, 1931.

Distribution:—Sumatra, Java, Malay Peninsula.

Dilochia parviflora J. J. S. in Bull. Jard. Bot. Buit. Ser. 3, xi (1931), 112.

C. 3246, Tenompok c. 5,000 feet, April, 1933. *Sepals pale yellow suffused violet outside and at the base. Petals pale yellow with violet base. Lip blade pale yellow suffused pale violet at the apex, side lobes pale yellow, midlobe whitish suffused pale violet at the base, keels white. Column pale yellow suffused violet towards the base.*

Distribution:—Endemic.

Dilochia gracilis Carr in Gard. Bull. Str. Settle. 8 (1935), 91. *Arundina gracilis* A. & S. Orch. vi. (1920), 96.

C. 3119, SFN 26550, Marei Parei c. 5,000 feet altitude, March, 1933. *Sepals and petals cream suffused purple on the back except the margins. Lip creamy white, blade dotted purple, a large sulpur-yellow blotch at the base of the midlobe. Column white. Anther brown with a paler boss.*

Clemens 29123, Kamborangah 8,000 feet terrestrial, March 24th, 1932; s. n. above Lumu Lumu 7,000 feet, January 10, 1932.

Locally abundant on ridge tops epiphytic but more commonly terrestrial, 5,000-7,500 feet.

Distribution:—Endemic.

Arundina speciosa Bl. Bijdr. (1825), 401.

C. 3174, SFN 26800, Menetendok/Kinataki divide c. 3,500 feet, March 22nd, 1933. Locally abundant on landslips, etc.

Distribution:—Sumatra, Java, Malay Peninsula, Celebes.

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PALMAE MALESICAE[1]

III.—Notes on some Malaysian Calami

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The results embodied in this paper were obtained mainly during a study undertaken by me in order to make myself familiar with the technique of describing and classifying the lepidocaryous palms of the Old World. A preliminary attempt to study these palms was made at the Botanic Gardens, Singapore, but as the Singapore herbarium does not possess representative specimens of some of the groups into which Beccari has divided the genera of these palms and also as very little material from the Singapore herbarium was seen by Beccari [(2)] a man to whom systematists owe more than to anybody else for bringing order into the classification of these palms which were previously in a maze of regular confusion—I was not able to make much headway in this my undertaking. I therefore made a second attempt, at the herbarium of the Botanic Gardens, Berlin, and as a result I have been able to prepare this paper. The success this time was due largely to the fact that I had a free access to the Berlin herbarium which possesses much authentic material carefully arranged by Prof. M. Burret, from all parts of the world where *rattans* grow. After completing the main part of my inquiry into these palms in Berlin, I was able to verify the accuracy of many of my conclusions and results in the herbaria of the Royal Botanic Gardens, Kew, and of the British Museum, London. My thanks are therefore due to the Keepers of all the three herbaria, and also to Prof. H. Harms and Prof. M. Burret of Berlin who were ever ready to help me with advice whenever I found myself in any difficulties.

Seventeen species of *Calamus* are discussed in this paper, of which the following 8 are new: **C. orthostachyus, C. conjugatus, C. dachangensis, C. Kiahii, C. Kjellbergii, C. rostratus, C. stramineus** with its **var. megalospermus** and **C. tenompokensis.** Of these new species, *C. orthostachyus* and *C. Kjellbergii* are from Celebes and the rest from Borneo *i.e. C. conjugatus* from Mt. Matang and the remaining five from the Kinabalu Mountain Range. This

1. *Palmae Malesicae I* in Fedde, Repertorium XXXV (1934) 273–283; *II* in Gard. Bull. S. S. VIII (1935) 159–163.

2. Much of the Singapore material was worked out by Ridley who had his own system of classifying the Lepidocaryae palms. This system is much less satisfactory than that of Beccari and it is unfortunate that Ridley did not adopt Beccari's system when preparing his Flora of the Malay Peninsula V published in 1925.

opportunity is also used to supplement the somewhat inadequate description of **C. Burkillianus** that has been published and to describe its male plant which was not known before. This species has also been recorded from another island, Pulau Kapas, lying to the north of the Tioman island (on the East coast of the Malay Peninsula), whence the species was originally described. Similarly the female plant of **C. kandariensis** (from Celebes), a species known only from a male plant, has been described. Reasons have been adduced to keep **C. diffusus** distinct from *C. Oxleyanus* and to reduce *C. pauciflorus* to **C. filipendulus**, *C. distans* to **C. luridus** and *C. Hewittianus* and *C. Jaherianus* to **C. myriacanthus**. **C. longisetus** was not recorded for the Malay Peninsula, though it was described from the Andamans and South Burma as far south as Tenasserim; but I have detected that this species has been collected twice in Langkawi island by Haniff and that it has been wrongly referred by Ridley to *C. arborescens*. The confusion that had crept over *C. luridus* and **C. muricatus** owing to the misidentification of specimens by Ridley has been cleared. Already Beccari had pointed out that the specimens of *C. laxiflorus* and *C. scabridulus* had been wrongly determined by Ridley as *C. luridus* [cf. Beccari in *Ann. Roy. Bot. Gard. Calc.* (quoted hereafter as *Calcutta Annals* or *Calc. Ann.*) XI *Suppl.*, 1913 pp. 13 and 33]. I have now found that some specimens identified by Ridley as *C. luridus* are really *C. muricatus*. As a result, the range of *C. muricatus*, which was regarded as endemic in Borneo is extended to the Malay Peninsula, while that of *C. luridus* which, on the authority of Ridley, was believed to occur also in Borneo (cf. Merrill, *Enum. Born. Pl.* 1921, p. 75) has become restricted to the Malay Peninsula only. **C. polystachyus** was hitherto considered to be native of Sumatra. The possibility of this record being wrong has been pointed out, while the species has been shown to occur as native in Sandakan, Borneo. Its fruits are also described for the first time.

It may perhaps be not out of place to draw the attention of botanists to some of the defects I have noticed in the recent collections and descriptions of the species of *Calamus* and *Daemonorops*. An inspection of some of the recent collections in the various herbaria I visited in Europe shows that the importance of the leaf-sheaths for the classification of these palms has not been understood by most of the recent collectors, though about three or four decades ago Beccari had written to demonstrate their importance and had later developed this thesis at length in his monographic studies published in the *Calcutta Annals* XI (1908) and XII (1911). There is many a species awaiting a critical study to clear its taxonomic status or position and though the

species has been re-collected in recent years, yet nothing further can be done because collectors have not made any attempts to secure better material to show its leaf-sheaths. Further it is important that collectors should record in the field-labels whether the leaves of a particular *rattan* terminate in a cirrus or not, noting at the same time its length when present; for from the leaf fragments that are usually preserved in herbaria it is not always possible to say whether a particular species bears a long or merely a short, abortive, cirrus to the leaves and this character very often affords a good clue in recognising the group to which a given *rattan* belongs. I have come across cases where, while the specimen from a principal set contains only the male organs, the specimens in the secondary sets distributed to other herbaria and purporting to be the exact duplicates of the former and therefore bearing the same field number, contain female spadices or spikelets and no male; or *vice-versa*. Neither of the specimens give a clue to show whether or not these specimens were derived from one and the same plant. If both sorts of flowers are found on one and the same plant, it is desirable to include both kinds of flowers in one specimen. If different sexes are produced by different plants, then the specimens derived from the male plant should bear a different number from the ones taken from the female, and a note should be inserted in the field label to show whether both the sexes were represented in one group of plants growing together as if in a clone, or in different groups. It is therefore highly desirable for the institutions which send or support expeditions where *rattans* are indigenous, to give the collectors the necessary instructions on this matter so that the future collections may not suffer from the same defects as the ones made when these palms were very little understood and when botanists themselves did not know what parts were of diagnostic importance for these palms.

I have also noticed an unfortunate tendency to omit in the description of *rattans* to make any mention of the characters regarding the terminal leaflets (whether free or connate), the apex of the primary spathes (whether prolonged into a long, ear-like lobe and dilated in the upper parts, or tubular and truncate, or lacerate or not, etc.), spadix branches, spikelets and involucrophore (whether sessile or pedicelled), perianth (pedicelliform or not), etc. I call this tendency unfortunate because such characters are of great diagnostic value to distinguish most of the *rattans* and to find their affinities as has been amply demonstrated by Beccari (*op. cit.*). In the remarks made under *C. luridus*, I have pointed out the utter uselessness for practical

systematics to take into consideration the number of the transverse series of the scales on the *rattan* fruits. If the number is to be given, then it should refer to the longitudinal series.

A numerical list of the specimens cited in this paper is appended to show the species under which they are enumerated.

1. Calamus orthostachyus Furtado spec. nov.

Caudex scandens, circ. 8 m. longus. Frondis *vagina* spinis ad 0.8 cm. longis, basi dilatatis armatissima, infra petiolum gibbosa. *Ochrea* brevis ut videtur. *Petiolus* basi eomodo armatus, altera parte non visus. *Frondes* cirrhiferæ, secus rhacheos dorsum unguibus ad 5-fidis armatæ, parte pinnifera circ. 60 cm. longa. *Cirrhus* circ. 70 cm. longus, unguibus ad 5-7-fidis præditus. *Segmenta* plurrima, æquidistantia, glabra, 2.5-3 cm. inter se dissita, ad 25 cm. longa, 1.5 cm. lata, linearia, basi subito contracta, apicem versus sensim attenuata, acuminata vel fere filiformiter acuminata, apice in margine setosa, secus costam mediam setis ad 1 cm. longis utrinque prædita. *Spadix foemineus* erectus ut videtur. *Spathae primariae* (?) brevissimæ, cylindracæ, inermes, 1-2 cm. longæ, dorso elongatæ, acutæ. *Spathae secundariae* et *tertiariae* ad annulum brevissimum reductæ, dorso triangulariter productæ. *Rami primarii* (?) rigidi, ad 18 cm. longi, utrinsecus spiculas 8 gerentes, axi interjecta fere terete. *Spiculae* 4-8 cm. longæ, utrinsecus fructus 10-19 gerentes, fere patentes. *Involucrophorum* pedicelliforme vel subpedicelliforme. *Involucrum* leviter concavum. *Perianthium* fructiferum pedicelliforme, calyce corollæ acquilongo, apice trifido. *Fructus* ovato-oblongus, basi rotundatus, apice contractus, rostratus, cum rostro atro 0.2 cm. et perianthio 0.2 cm. longo omnino 1.3 cm. altus, 0.5 cm. in diam. *Squamae* stramineæ, secus marginem atropurpureæ, dorso canaliculatæ, in orthostichis 15 dispositæ. *Semen* nigrum, oblongum, 0.6 cm. longum, 0.3-0.4 cm. latum, 0.25-0.3 cm. crassum, rhaphen secus paulo elevatum, ceterum leviter rugosum vel non. *Albumen* album, homogeneum. *Embryo* basilaris. *Spadix masculus* juvenilis tantum visus, ut fœmineus.

CELEBES: on Bœlœ (=Mountain) Parema, alt. circ. 4,300 feet, in rain forest. (Kjellberg No. 2649. Type in the Berlin Herbarium).

The collector notes that the leaf-sheath is provided with thorns and the leaves have a long cirrhus.

In the specimen in Kjellberg's herbarium there is a terminal portion of a male spadix bearing the same number as the female specimen in Berlin. The collector does not

state whether this male portion was obtained from the same plant as the female one. The male portion of the spadix is quite similar in structure to the female, and the species would therefore appear to fall in *Group XV** of Beccari. But the erect spadix with its reduced spathes and with its somewhat pedicelliform involucrophorum distinguishes it at once from all the other species of *Calamus* known to me. In these respects it resembles very much some of the *Calamus*-like species of the genus *Daemonorops*, but the pedicelliform perianth with its calyx equal to corolla and the homogeneous albumen make one assign the species to the genus *Calamus*.

2. Calamus Burkillianus Becc. *ex* Ridl. Flor. Mal. Pen. V (1925), 56. Planta mascula.

Caudex scandens. Frondis *vagina* straminea, infra petiolum gibbosa, aculeis solitariis, applanatis, basi dilatatis, apice obscurioribus vel non, 0.8-1.5 cm. longis. *Ochrea* brevis, extus hispida, trichomatibus longis, rigidis, sinuosis, adpressis, deciduis, ferrugineis. *Petiolus* circ. 30-45 cm. longus ut videtur, stramineus, leviter furfuraceus, furfuro griseo vel brunnescenti, fugaceo, super applanatus vel concavus, ad 1 cm. latus, subtus convexus, aculeatus vel non, secus margines aculeis solitariis distantibus præditus. *Rhachis* subtus aculeis solitariis armata, non cirrhifera. *Segmenta* plurrima, equidistantia, alternantia vel subopposita, 2-5 cm. inter se dissita, lineari-lanceolata, 25-35 cm. longa, 1.5-1.8 cm. lata, in apicem ad margines spinulosam terminata, costis 3 percursa, costa media robustiore apicem versus subtus setosa, alteris supra eodemmodo armatis, subtus glabris, segmenta terminalia ambo basi connata. *Spadix masculus* longe flagelliferus, unguiculatus, tenuis, duplo vel sub-triplo ramificatus. *Spathae primariae* tubulosæ, aculeolatæ, apicem versus fissæ, summo truncatæ; *secundariae* et *Spathellae* membranacæ, fusco-tomentosæ, truncatæ. *Rami primarii* nonnihil supra spatham orientes, 20-25 cm. longi, ramis secundariis utrinsecus ad 10, alternantibus; *rami tertiarii* abbreviatissimi 1 cm. usque longi, flores circ. 8 gerentes. *Corolla* 0.4 cm. longa, calyce duplo longior.

MALAY PENINSULA: **Female specimens:** *Pulau Tioman* off the Pahang Coast, Joara Bay (Burkill, s. n. in June, 1915. Type). *Tringganu*, Pulau Kapas (Holttum, 15211). **male:** *Pulau Tioman*, Ayer Batang (Henderson, 18465).

Material of this species was submitted to Beccari who had proposed the above name, but it was never published by him. Since the specific description given in the *Flora* was entirely drawn by Ridley, I think the species ought to be accredited to Ridley and may be quoted as above.

* In *Calcutta Annals* XI, 1908.

I have described the male plant at some length in order to supplement the inadequate description of Ridley. It may also be added that the involucrophorum is not pedicelliform and that the fruiting perianth is explanate. The scales are arranged in 15-16 longitudinal series on the fruits, though Ridley gives only 10 as the number of rows (cf. my remarks on *C. luridus* re counting of these rows). The species belongs to the *Group V Section B. 1* of Beccari in the *Calcutta Annals* and is perhaps allied to *C. siamensis* and and *C. pseudotenuis.* Judging from the plate 95 given by Beccari (*Calc. Ann.* XI, 1908, p. 266), this species could be easily confused with *C. horrens* Bl. a species described from a sterile specimen; but its ocrea is described as glabrous and the terminal leaflets free to the base. Recent fruiting and and flowering material from the type region seems to show that *C. horrens* is a form of *C. tenuis,* a species with a distinct pedicelliform perianth (*Calc. Ann. XI Suppl.* 1913, p. 39).

3. Calamus conjugatus Furtado spec. nov.

Caudex erectus (vel semi-scandens?), gracilis, 0.5-0.8 cm. (sine vagina 0.4-0.5 cm.) in diam. Frondis *vaginæ* fusca, infra petiolum leviter gibbosa vel non, apice oblique truncata, corrugationibus annularibus, interdum interruptis, transversis interdum obliquis, gracilibus, 1-2 mm. inter se remotis, secus marginem fimbriatis vel verruculosis, verruculis interdum pungentibus. *Ochrea* brevis, corrugata. *Petiolus* gracilis, 10-15 cm. longus, 0.2 cm. crassus, ima basi extus eodemmodo corrugatus, ceterus lævis vel spinulis aut verruculis sparsis, obscurissimis præditus, supra canaliculatus, apice in cirrhum abortivum 1-1.5 cm. longum, subtus aculeis robustiusculis, solitariis, deflexis armatum transiens. *Segmenta* gemina, opposita, patentissima elliptico-lanceolata, glabra, 5-6 costulata, apicem versus quam basin magis attenuata, ima basi abrupte contracta, plicatula, secus marginem apicum setulosa. *Spadix foemineus* circ. 35 cm. longus, ramis primariis 4, ad 6 cm. longis, sessilibus, utrinsecus spiculas 4, alternantes, ad 1.5 cm. longas gerentibus. *Spathae primariae* tubulosæ, apice oblique truncatæ, spinulis vel verruculis sparse armatæ, vel scabridæ. *Spathllae* et involucra scabridæ. *Involucrophorum* sessile. *Flores, fructus* et spadices masculi ignoti.

BORNEO: Matang (Ridley, in July, 1903. Type in Singapore).

From the characters observed this species falls in Beccari's *Group V, Sect. A* and appears to be a close ally of *C. zonatus* Becc. under which name the species was distributed by Ridley. It is however easily distinguished from the latter by its leaves which bear only one pair of

spreading, opposite, elliptic-lanceolate leaflets growing at right angles to the rachis, whereas in *C. zonatus* the leaves are divided into many, linear leaflets which are moreover porrect and not spreading. *C. flabellatus* Becc. placed by Beccari in *Group V, Sect. B* has also a pair of leaflets which are, however, porrect and connate at base, while it has a sheath which is quite unarmed and destitute of any transverse corrugations. *C. digitatus* which sometimes also produces unijugate leaves differs from the species here described by its leaflets being oblong-spathulate, abruptly contracted at the apex and connate at base, and by the presence of distinct spines and the absence of any transverse corrugations on the sheaths. *C. corrugatus* which in corrugations and the shape of leaflets approaches somewhat *C. conjugatus* is easily distinguished from the latter by its many-jugate leaves and by its short, hairy-furfuraceous petiole.

4. Calamus dachangensis Furtado spec. nov.

Caudex scandens, circ. 3-7 m. longus, sine vagina 1.2-1.4 cm. in diam. Frondis *vagina* flagellifera, infra petiolum gibbosa, oblique truncata, setis basi intumescentibus, tennuibus vel robustioribus dense obtecta, inter quas aculeis rigidis, ad 0.8 cm. longis, leviter reflexis, solitariis vel confluentibus prædita. *Ochrea* brevissima, extus ad marginem iisdem setis ut in vagina. *Frondes* cirrho carentes, cum petiolo circ. 45 cm. longæ, utrinsecus segmentis circ. 30. *Petiolus* 10-15 cm. longus, supra applanatus, aculeis sparsis brevibus, subtus convexus, aculeis in margine uti supra, in dorso majoribus armatus. *Rhachis* dorso aculeis solitariis vel trifidis sparsis prædita, utrinque decidue ferrugineo-floccosa. *Segmenta* ad 30 cm. longa, 1.5 cm. lata, acquidistantia, 1-1.5 cm. inter se dissita, (apicalia breviora, libera vel basi paululo confluentia), subopposita vel alternantia, linearia, ad margines setulosa, e basi nonnibil plicata in apicem sensim attenuatum, acuminatum summo setis paucis præditum producta, subtus tomento floccoso ferrugineo deciduo obtecta, costis supra 3 distinctioribus, quarum media robustiore, longe-setosis (setis=1 cm. longis), subtus sat obscuris, media parce spinulosa. *Spadix foemineus* cum flagello apicali circ. 2 m. longus, duplo ramificatis, infra parce et breviter armatus, in parti terminali valide unguiculatus. *Rami primarii* 2-4, glabri, ad spatharum orificium orientes, 8-15 cm. longi, rami secundarii floriferi, sessiles, 5-6 cm. longi, floribus in seriebus duabus dispositis, secundis, utrinsecus 4-7. *Spathae primariae:* infima anceps, glabra, in marginibus aculeolata, oblique truncata; superiores teretiusculæ, inermes vel aculeatæ, glabræ, oblique truncatæ. *Spathae secundariae* et tertiariæ (=spathellæ) infundibuliformes, glabræ,

truncantæ. *Involucrophorum* distincte pedicilliforme; *involucrum* disciforme. *Perianthium* floriferum circ. 0.4 cm. longum, calyce corollæ æquilongo; fructiferum pedicelliforme, basi truncatum, apicem versus contractum, dein in lobulos dilatatum. *Fructus* elongato-ellipticus, utrinque rotundatus apice abrupte mammillatus, cum mammilo 0.1 cm. et caudiculo 0.1-0.15 cm. longo, 1.6-1.8 cm. altus, circ. 1 cm. in diam. *Squamae* stramineæ, secus marginem fuscæ, in seriebus verticalibus 17-18 imbricatæ. *Semen* dense resinatum, lineari-oblongum vel oblongum, utrinque rotundatum, in latere foveali nonnihil applanatum, fove chalazali elongata, sulcis vel plicis irregularibus radiantibus ad embryonem in altero latere situm convergentibus, 1.2-1.4 cm. altum, 0.5-0.8 cm. latum, 0.4-0.6 cm. crassum. *Albumen* in parte exteriore fuscum, resina nigricans, leviter ruminatum vel sulcatum, sulcis resinosis. *Embryo* fere basilaris vel ad latus proxime basin situs.

Planta mascula ut fœminea, differt spadice graciliore, calyce quam corolla 0.5 cm. longa duplo breviore.

BRITISH NORTH BORNEO: Mt. Kinabalu, on *Gunong Dachang*, alt. circ. 11,000 feet, (legit Furtado, comm. Clemens sub no. 29, 198, female. Type in Singapore), *ibid* (leg. Furtado, comm. Clemens sub num. 29, 198*a* male and female; may have been mixed during drying).

This belongs to *Group X* of Beccari and is very closely related to *C. exilis* Griff., from which, however, it differs in its leaf-sheaths being more thorny, in the absence of scabrid hairs or beard on the leaf-rachis, spathes and spadix-axis, in the perianth being somewhat contracted at the mouth of the tube and not distinctly campanulate, and the leaflets bearing thick ferrugineous tomentum beneath and long setæ in the upper surface of the 3 principal nerves. In *C. dachangensis* the leaflets appear also broader and the fruits more rounded at the apex and the base.

From *C. Gibbsianus* Becc. which resembles this species in many respects and which also belongs to the *Group X*, *C. dachangensis* is easily distinguished by its greater number, closer and equidistant leaflets.

The stem is used to a certain extent by the Dusuns in wicker work, though they seldom visit the locality as it lies too far out of their way and also in the higher and therefore colder altitudes. Perhaps this *Calamus* has the same value as *C. Gibbsianus* or any of its allies growing at Kamborangah. The altitude of the Gunong Dachang may also be the same as that of Kamborangah. Dachang is not included in the maps I have consulted.

5. Calamus diffusus Becc. in Hk. f. Flor. Brit. Ind. VI (1892), 447; Ridley Mat. Flor. Mal. Pen. II (1907), 209; **stat. nov.**

C. Oxleyanus T. & B. *sensu* Ridl. Flor. Mal. Pen. V (1925), 62, quoad synonym *C. diffusus*, **syn. nov.**

This species was based on very imperfect material collected by Thomas Lobb in Singapore, consisting, as described originally by Beccari, of many equidistant, linear-lanceolate leaflets with clawed, non-cirrhiferous (always ?) rachis and strongly clawed [and therefore flagelliferous] male spadix. Probably because the spadix is somewhat similar to that of *C. Oxleyanus* and perhaps because the species has not been recorded again even in Singapore, the type locality, Beccari was later led to the conclusion that the spadix belonged to *C. Oxleyanus*, a conclusion recorded by him in the *Calcutta Annals* XI, 1908, p. 450, but he did not express any opinion regarding the leaf. In the *Flora*, Ridley relegates the entire species with spadix and leaves as a synonym of *C. Oxleyanus*, though he himself had remarked previously (*Materials, II*, 1907, p. 209) that *C. diffusus* is distinguished from *C. Oxleyanus* by its equidistant leaflets, while the latter has leaflets arranged in groups. After examining the type of *C. diffusus* in Kew, I came to the conclusion that it should be kept as distinct until one finds himself in a better position to determine its exact status. On my return to Singapore, I found that the material collected by Ridley under No. 11215 in the Batu Pahat district of Johore, and quoted by Ridley under *C. Oxleyanus* agrees very well with the description of *C. diffusus*, though the specimen is female. The leaf is young, is not provided with a cirrhus and has equidistant leaflets such as described for the species; and perhaps a further comparison may show that *C. laxiflorus* Becc. is also the same species. At any rate the conclusion seems to be clear that *C. diffusus* is not *C. Oxleyanus*, at least as far as the leaves are concerned.

6. Calamus filipendulus Becc. in Hook. f. Flor. Brit. Ind. VI (1892), 443; Rev. Bot. Curv. Ind. II (1902), 202; Calc. Ann. XI (1908), 188, pl. 45; Ridl. in Mat. Flor. Mal. Pen. II (1907), 193; Journ. F.M.S. Mus. IV (1909), 87; et Flor. Mal. Pen. V (1925), 51.

C. pauciflorus Ridl. Flor. Mal. Pen. V (1925), 56, **syn. nov.**

Ridley's species is slightly less scabrid than some of the duplicates of the syntypes of *C. filipendulus* collected by Kunstler and preserved at Kew. In the *Key* given by Beccari in the *Calcutta Annals*, *C. filipendulus* should have been included in the *Section A of Group V*, among the species numbered 24-27 and not in the *Section B*, for the secondary spathes, spathels, etc., in this species are conspicuously scabrid. The *Key* given by Ridley in his *Flora* is rather difficult to follow and it is no wonder that Ridley

failed to recognise *C. filipendulus* in his *C. pauciflorus*. The following records should be added to those already given by Beccari.

MALAY PENINSULA: *Pahang:* Telom Ridge (Ridley, 13921). *Perak:* Jor near Tapah (Haniff 14252); Tapah, at Pahang Road, 10th mile (Burkill and Haniff, 13446, and 13451, Syntypes of *C. pauciflorus*).

7. Calamus kandariensis Becc. Planta fœminea.

Caudex scandens, circ. 5 m. longus. Frondis *vagina* inermis, longitudinaliter striata, infra petiolum gibbosa, apice oblique truncata. *Petiolus* 10 cm. circ. longus, supra convexo-applanatus, aculeis brevissimis, ad 0.2 cm. longis, dispersis præditus, subtus convexus secus margines aculeis 0.2-0.3. cm. longis, reflexis, solitariis armatus, utrinque dense griseo-tomentoso-furfuraceus. *Rhachis* sine cirrho circ. 52 cm. longa, in parte basilari in eodemmodo descripto vestita, subtus aculeis et unguibus armata, utrinsecus segmentis 7-8. *Segmenta* 3-4 costulata, secus costas paulo plicata, infima solitaria, alternata; reliqua ad 2 aggregata, opposita vel subopposita, 12-15 cm. inter se remota, lanceolata, circ. 25 cm. longa, 3-4 cm. lata, supra viridia, subtus glauca, apice contracta, acuta, subulata vel non, utrinque inermia et basi decidue griseo-furfuracea. *Cirrhus* circ. 65 cm. longus, subtus unguiculatus. *Spadix foemineus* 0.75-1 m. longus, apice parte sterili 10 cm. longa, reflexo aculeolata terminatus. *Spathae primariae:* ad 15 cm. longæ, cylindrico-tubulosæ, striatæ, inermes vel dorso aculeolatæ, apice oblique truncatæ, basi contractæ, sensim in axin ipsam transeuntes. *Spathae secundariae* cylindricæ, striatæ, inermes, glabræ, apice oblique truncatæ. *Spathellae* tubulosæ, striatæ, truncatæ, dorso in apicem triangularem productæ. *Rami primarii* nonnihil supra spatharum apicem orientes. *Spiculae* 2.5-4 cm. longæ, in ramis primariis alternantes, circ. 1.5-3 cm. inter se remotæ, nonnihil supra spathas insertæ, utrinsecus fructus 4-6 gerentes. *Involucrophorum* pedicelliforme; *involucrum* disciforme. *Perianthium* fructiferum pedicelliforme. *Fructus* immaturi tantum visi, oblongi, fere cylindrici, apice abrupte rostrati, cum rostro 0.2 cm. et perianthii tubulo 0.1 cm. longo 1.4 cm. altus, 0.5 cm. in diam. *Squamae* badiæ, unicoloratæ vel marginem secus paulo obscuriores, in orthostichis 13-15 dispositæ. *Semen* juvenile. *Albumen* paulo ruminatum ut videtur. *Embryo* basilaris.

CELEBES: Karebbe, by the Malike River, circ. 150 feet alt. (Kjellberg, 2398 in Kjellberg's herbarium in Sweden, and in Berlin).

The collector's field notes state that this *Calamus* is a liane about 5 meters long growing along the river banks and that it is seldom found in flowers or fruits.

Though the plant here described bears larger, but fewer and more distant leaflets to the leaf which, moreover, become, on drying, greenish above and glaucous beneath (not brown as in the type), I think this plant is a female of *C. kandariensis* the type of which was also from the Celebes. Variations in the size of the leaflets and in their number on a leaf depend very largely on the age and vigour of the plant and sometimes even on the sex, while the colour depends on the habitat, vigor and the mode of drying. Unless therefore one gets a series of material of both the male and female plants, one cannot decide whether a certain plant is typical or represents a varietal form of a species. The spathes are somewhat inflated like those of the male spadix. There is no doubt that this species belongs to Group XII of Beccari as defined in the *Calcutta Annals*.

8. Calamus Kiahii Furtado spec. nov.

Caudex scandens, circ. 7 cm. longus, sine vagina 1-1.5 cm. in diam. Frondis *vagina* flagello carens, infra petiolum gibbosa, aculeis 1-1.5 cm. longis, robustis, horizontalibus, basi intumescentibus, dispersis, solitariis vel confluentibus armata, apice oblique truncata. *Ochrea* brevissima, apice in ligulam circ. 1 cm. longan reducta. *Frondes* cum petiolo cirrhoque 1.5-2 m. longæ, utrinsecus segmentis 7-9. *Petiolus* 5-12 cm. longus, supra ad basin leviter canaliculatus. *Rhachis* in parte pinnifera circ. 80 cm., in cirrhifera circ. 70 cm. longa, subtus aculeata; aculeis in parte basilari solitariis, in altera parte trifido-unguiformibus. *Segmenta* plerumque bina, per greges 3-4 remotos alternantes vel subopositos disposita, lanceolata, coriacea, concoloria, 5-7-costata, nervos sub-secundarios sat obscures secus plicata, glabra, media maxima, circ. 23 cm. longa, 2.2-2.7 cm. lata, maxima latitudine supra mediam partem sita, basi longe alternata, apice acuminata et ad margines spinulosa nervulis, transversis distinctiusculis. *Spadix foemineus* circ. 40-50 cm. longus, ramis primariis 3-5. *Spathae primariae* aculeis recurvis parce armatæ, infundibuliformes, oblique truncatæ, lepidibus piliformibus ferrugineis obtectæ, orificio ciliolatæ. *Spathae secundariae* et *tertiariae* similes, truncatæ, inermes, ferrugineo-lepidotæ. *Rami* primarii et secundarii ad spatharum orificium orientes; secundarii flexuosi, circ. 5 cm. longi floribus 6-9 distantibus, distichis. *Involucrophorum*, sessile. *Involucrum* cupuliforme. *Perianthium* pedicelliforme, 0.3 cm. altum, corolla calyce æquilonga. *Fructus* ovoideus vel subglobosus cum rostello apicali 0.2-0.3 cm. et caudiculo basali 0.2-0.3 cm. longo, 2 cm. longus, circ. 1.2 cm. in diam. *Squamulae* stramineæ, seriebus 18 verticalibus imbricatæ, ad margines badiæ. *Semen* ambitu obovatum vel potius elongato-obovatum, basi attenuatum et acutum, apice rotundatum interdum obscure

apiculatum, lateribus basin versus compressis, 1.4 cm. circ. longum, 1 cm. latum, 0.8 cm. crassum. *Rhaphe* elongata. *Albumen* profunde ruminatum. *Embryo* lateralis, modice infra dimidium latus, nonnihil supra basim situs.

BRITISH NORTH BORNEO: Mt. Kinabalu, at Lumu-Lumu, circ. 6,000 feet alt., (leg Furtado, comm. Clemens, sub. no. 29195. Type in Singapore).

This species belongs to Beccari's *Group XV B.* and is related to *C. caesius* Bl., from which it (*C. Kiahii*) can be easily distinguished by its much narrower, lanceolate (not oblanceolate), coriaceous, concolorous leaflets, by its straight (not reflexed) more closely placed spines on the sheath and by its lepidote spathes. The seed of *C. caesius* is described to be ovoid or to have a rounded base and subacute apex, but in *C. Kiahii* the seed is oblong or obovate with broad apex and often a narrowed base.

Named in honour of Kiah bin Haji Salleh, the plant collector of the Botanic Gardens, Singapore, who accompanied me on my trip to the Kinabalu Mountains in 1932.

9. Calamus Kjellbergii Furtado spec. nov.

Caudex scandens, circ. 5 m. longus, sine vagina 1.5 cm. in diam. *Frondes* ut videtur longæ, cirrho circ. 1.20 m. longo. *Vagina* spinis brevissimis vel indistinctis, distantibus armata, infra petiolum gibbosa, apice oblique truncata. *Ochrea* brevissima, inermis. *Petiolus* partim tantum visus infra convexus, dorso et margines secus eomodo armatus, supra concavus vel applanatus, spinis brevibus præditus. *Rhachis* dorso unguibus validis 3-4 fidis, apice fuscis et aculeis reflexis armata. *Segmenta* alternantia circ. 15 cm. remota, utrinque attenuata, basi angustata, apicem versus sensim vel subito acuminata et secus margines spinulosa, summo breviter bifida, utrinque glabra, pluricostulata, secus costas sat plicata, 37.5 cm. longa, 5.5 cm. lata; costa media validiuscula, secundariis et tertiariis tenuioribus, fere æqui crassis. *Spadix foemineus* quam frondes brevior et non flagelliferus ut videtur. *Spathae primariae* tubulosæ, ancipites, dorso carinatæ, spinis brevissimis præditæ, circ. 12 cm. longæ, apice oblique truncatæ, in apicem acuminatissimam productæ; *.secundariae* tubulosæ, infundibuliformes, inermes, glabræ, basi ancipites, apice oblique truncatæ. *Spathellae* spathis secundariis consimiles, apice sæpe ciliolatæ. *Rami* primarii circ. 25 cm. longi, sessiles vel subsesiles, circ. 10 spiculis ferentes, in appendiculum 2 cm. longum, inerme exeuntes. *Spiculae* sessiles, (=ad spatharum orificium orientes), usque ad imam basin fructiferæ, 2-3.5 cm. longæ, utrinsecus fructibus 3-4. *Involucrophorum* sessile, apice cupuliforme. *Involucrum* late pateriforme, in involucrophoro fere inclusum. *Perianthium* fructiferum

explanatum, 0.8 cm. in diam., concavum, calyce corollæ æquilongo. *Fructus* depresso globosus, apice abrupte nonnihil rostratus, cum rostro 0.3 cm. longo 1.7 cm. altus, 1-1.1 cm. in diam. *Squamae* badiæ, secus marginem fuscæ, dimidiam secus canaliculatæ, in seriebus verticalibus 18 imbricatæ: *Semen* globosum, 0.7 cm. in diam, rhaphe haud impressa, sublæve, ceterum cerebriformiter alveolatum. *Albumen* ad ¼ diam. circ. ruminatum. *Embryo* basilaris.

CELEBES: Kawata, by the river Maliki, in rainforest, alt. circ. 650 feet (Kjellberg, No. 2367. Type in Berlin and with Kjellberg in Sweden). Ripe fruits are eaten by the local people.

This species belongs to the *Group XV-A* of Beccari and is very closely related to *C. arugda* Becc. from the Philippines, which however is described as having its leaflets bearing spiny margins and sometimes spinulous costæ above, its female flowers usually geminate in the lower part of the spikelet and the fruit scales in 15 longitudinal rows and not channelled along the middle. *C. Kjellbergii* on the other hand, exhibits no traces whatsoever of any geminate female flowers (only fruiting material was available for examination), has its fruiting scales arranged in 18 vertical rows and channelled along the middle, and bears leaflets which have spinules only along the margins of their apical portions.

10. Calamus longisetus Griff. in Calc. Journ. Nat. Hist. V (1844) 36, et Palms Brit. Ind. (1850)44, t. 189 AB; Becc. in Calc. Ann. XI (1908) 134, pl. 9.

C. arborescens Griff. sensu Ridl. Journ. Roy. As. Soc. Str. Br. 59 (1911) 215, et Flor. Mal. Pen. V (1925) 64, quoad specimen lankawiense. **syn. nov.**

MALAY PENINSULA: Langkawi *sine loc.*, (Haniff. in Sept., 1900 male). *Gunong Raya* (leg. Haniff, comm. Ridley sub. n. 15910 female).

This extends the distribution of this species which was hitherto recorded only for the Andamans and South Burma as far south as Tenasserim. It is easily distinguished from *C. arborescens* with which Ridley had confused it, by the disposition of the leaflets in definite groups at least in the lower portion of the leaf, by the absence of white or glaucous substance in the nether surface of the leaflets and by the presence of flagellum to the spadix.

11. Calamus luridus Becc. in Hk f. Flor. Brit. Ind. V (1892) 445; Ridl. Mat. Flor. Mal. Pen. II (1907) 198, pp. (*ex altera parte=C. laxiflorus, C. muricatus* and *C. scabridulus*), et Flor. Mal. Pen. V (1925) 56, pp.

C. distans Ridl. Flor. Mal. Pen. V (1925) 56, **syn. nov.**

I have compared the types of Ridley's species with the duplicates of the syntypes of *C. luridus* preserved at Kew and find no material difference to give an independent status to Ridley's species.

Contrary to the usual practice, Ridley has the habit of stating, in his descriptions of *Calami*, the number of the transverse rows of scales on the fruits and in doing so he mentions the number of only those rows which appear to him very important. Hence he arrives at 5 as the number of rows in the fruits of *C. distans*, though so low a figure has not yet been noted in any *Calamus* fruits. This method of counting rows of the fruit scales is very misleading as there is no sure criterion by which the scales could be divided into two classes of major and minor importance; and, if one were to attempt to count all the transverse series of scales, much useful time would be wasted since the number thus obtained will be dependent on the development of the fruits and also of the apex, and even if fully developed fruits were available in every case, the method will not be serviceable for practical systematics as the minuteness of many of the scales will discourage botanists from making use of this character in systematic accounts. Hence it is desirable that only longitudinal series of rows should be mentioned in descriptions and these are not only easy to count and independent of the size of the fruits but they are also most useful in identification of *rattans*. The scales in the type of *C. distans* are arranged in 15-16 longitudinal series. The following specimens in the Singapore herbarium belong to this species.

MALAY PENINSULA: *Johore*, Gunong Berhidong, alt. 1,000 feet (Holttum 10974); Sungei Tebrau (Ridley, 9207). *Pahang*, Fraser Hill, alt. circ. 4,000 feet. (Burkill and Holttum, 8807); Sungei Yet on Fraser Hill, alt. 3,700 feet (Nur. 11,130). *Negri Sembilan*, Bukit Senaling at Kuala Pilah (Moorhouse, ver. name *Rotan Kerai* and *Rotan Perut Ayam*). *Perak*, Kinta Valley (Ridley, 9814); Taiping Hills (Ridley, 11,987). *Kelantan*, Gunong Sitong, alt. 900 feet (Nur with Foxworthy, 12,188, Type of *C. distans*).

The vernacular name *Rotan Perut Ayam* apparently belongs to the species *C. muricatus*, for it appears that, instead of writing the name on a different sheet Ridley put it through an error on the sheet on which the spadix of the *Rotan Kerai* was mounted. Both these specimens were sent by Moorhouse from Kuala Pilah.

As far as is known this species has not been recorded from Borneo. Ridley's statement (repeated by Merrill in *Enum. Bornean* Pl., 1921. p. 75) that this species occurs in

Borneo is probably based on misidentification of the specimens of *C. muricatus;* in fact I have found some of the specimens of *C. luridus* put by Ridley in the cover of the former.

12. Calamus muricatus Becc. Nelle For. di Borneo. (1902) 609; Calc. Ann. XI (1908) 172 & pl. 33, & Suppl. (1913) 9.

C. luridus Becc. *sensu* Ridl. Mat. Flor. Mal. Pen. II (1907) 198 et Flor. Mal. Pen. V (1925) 56 p.p. **syn. nov.**

MALAY PENINSULA: *Selangor,* Rawang (Ridley, 12118). *Negri Sembilan,* Bukit Senaling at Kuala Pilah (Moorhouse).

This species was hitherto regarded as endemic in Borneo.

The vernacular name *Rotan Perut Ayam,* quoted by Ridley under *C. luridus* apparently belongs to this species. Moorhouse had sent two Rotans from Bukit Senaling, one known as *Rotan Kerai* and the other *Rotan Perut Ayam.* Obviously through an error the label bearing the latter name found its place on the sheet on which the spadix of *Rotan Kerai* (*C. luridus*) was mounted.

13. Calamus myriacanthus Becc. in Rec. Bot. Surv. II (1902) 214; Calc. Ann. XI (1908) 251, pl. 85, et. Suppl. (1913) 38. (Type from Mount Matang, Borneo).

C. Hewittianus Becc. in Calc. Ann. XI Suppl. (1913) 45 pl. 24 (Type from Mt. Matang). **Syn. nov.**

C. Jaherianus Becc. in Calc. Ann. XI Suppl. (1913) 46 pl. 25 (Type from Dutch Borneo). **Syn. nov.**

I have had an opportunity of examining some authentic material named by Beccari himself and preserved at Kew, and as a result I come to the conclusion that the above three species are identical. The young flowers have a strongly striated calyx as is seen even in the specimen collected at Sioul by Hewitt in 1905, sub. n. 29 and identified by Beccari as the male of *C. myriacanthus* in the *Calcutta Annals Suppl.* l.c., as well as in another specimen also collected at Sioul by Hewitt in 1906 (or 1900?), sub. n. J.; but, as the flowers develop, these striations tend to disappear or remain only in the lowermost portion of the calyx. The young spadices of *C. myriacanthus* would therefore be *C. Jaherianus* which is described from a male spadix only (with no leaves and sheaths), though from the other characters given the latter is scarcely separable from the former. In the type of *C. Hewittianus* the leaves are juvenile and tend to be glaucescent as in the above named Sioul specimens, but it is hardly distinguishable from *C.*

myriacanthus. The leaf-sheath with a portion of stem is not represented in the type, though it is described and photographed by Beccari. As there are not even marks to show that it was mounted on the sheet I conclude that the portion was inadvertently placed on the sheet when the latter was being photographed and so Beccari may have been misled to make of the specimen thus constituted a new species quite distinct from *C. myriacanthus*.

14. Calamus polystachyus Becc. Calc. Ann. XI (1908) 383 et in Suppl. (1914) 77.

Beccari had described this species from the specimens gathered from a plant of uncertain origin, cultivated in the Buitenzorg Botanic Garden. Later he found in the Buitenzorg Herbarium a specimen that had a ticket which probably did not belong to the specimen, since, according to Beccari, it is unthinkable that Teysmann would name the specimen, even provisionally, as *Calamus rhomboideus* Bl., a name apparently entered up on the ticket by Teysmann himself. This being the case I do not understand why Beccari regarded the specimen as coming from Sumatra. In the absence of other signs or evidences to show that the specimen was collected in Sumatra, it is better, in my opinion, not to go by the locality given on a wrong label and, therefore, to disregard altogether the record of the species for Sumatra.

The species is, however, known to be wild in Borneo in the vicinity of Sandakan, where Ramos found it twice in 1920 (cf. Ramos nos. 1400 and 1788 distributed from Manila without any specific name). Ramos specimens bear fruits which, to complete Beccari's description, are here described:—

Perianthium fructiferum explanatum, profunde partitum. *Fructus* globoso-ovatus vel ovatus, 1.5 cm. (cum rostello 0.1 cm. longo) altus, 0.7-1 cm. in diam. *Squamae* in orthostichis 12 dispositæ, stramineæ, in margine atratus vel non, dorsum secus canaliculatæ. *Semen* ambitu orbiculare vel ovoideum, 1 cm. longum, 0.8 cm. latum, 0.5 cm. crassum, fovea chalazali late concava, ceterum leviter sulcatum vel rugosum, extus albido-fibroso-tomentosum. *Albumen* albidum, homogeneum. *Embryo* basilaris.

BRITISH NORTH BORNEO: near Sandakan (Ramos. nos. 1400 et 1788).

This species is at once distinguished from all the others by the presence of two or three distinct spikelets at each secondary spathe in the lower part of the partial inflorescences. This and *C. aquatilis* Ridl. are the only species known to me to have a fibrous tomentose integument on the seeds. Beccari opines that this tomentose surface on

the seeds is due to the cellules of the integument persisting after the destruction of its fleshy part in drying. Like *C. aquatilis*, this species has leaflets which are finely spinulose along the costæ beneath, in which surface also it is provided with minute rusty scales. Were it not for the presence of more than one distinct spikelet in the axils of many secondary spathes it would not have been easy to separate this species from *C. aquatilis* Ridl. which also belongs to the same group (*Group XIV* of Beccari) though found only in the Malay Peninsula.

15. Calamus rostratus Furtado spec. nov.

Caudex scandens, ad 4 m. longus, cum vagina 2.5 cm. in diam. Frondis *vagina* flagellifera, oblique truncata, infra petiolum conspicue gibbosa vel geniculata, aculeis approximatis, valde applanatis, elasticis, patentibus, plus minus in seriebus obliquis vel transversalibus dispositis, ad 5 cm. longis, basi 0.6 cm. latis horride armata. *Ochrea* liguliformis ,ligulis deciduis, ad basin aculeis ut in vagina, ad 15 cm. longis et 0.6 cm. latis, porrectis prædita. *Frondes* cirrho carentes, cum petiolo 1.50-1.75 m. longæ, utrinsecus segmentis 48-53, circ. 2 cm. inter se remotis. *Petiolus* 7-20 cm. longus, flavescens, supra concavus, subtus convexus, secus margines ambo aculeis regidis, solitariis, rarissime confluentibus, 0.4-3 cm. longis ad 0.4 cm. latis, in duabus seriebus obscuris dispositis, subtus dimidium petiolum secus aculeis solitariis, brevioribus, remotis armatus. *Rhachis* flavescens, subtus aculeis solitariis remote armata. *Segmenta* æquidistantia, alternantia vel subopposita, rarissime opposita, linearia, basi paulo cuneata, apicem sensim attenuatam, acuminatam, ad margines spinulosam terminata, supra costis 3, quarum media robustiora, glabra, alteris subprimariis spinulosis percursa, subtus costas secus spinulis quam facie superiore magis approximatis, minoribus armata, basilaria angustissima, media longissima circ. 30-35 cm. longa, 1.5-1.8 cm. lata, apicalia brevissima basi ad 1/6 connata. *Spadix foemineus* cum flagello apicali circ. 4 m. longus, duplo- vel subtriplo -ramificatus, unguibus 4-furcatis armatus. *Rami* primarii sæpissime 4, remoti, longe-pedunculati, pedunculo ad maximam partem spatha incluso; ramis secundariis circ. 15, sessilibus, ad spatharum orificium insertis, floriferis, 10-15 cm. longis, circ. 5-7 cm. inter se dissitis, rarissime ramificatis, ramis tertiariis 3-5 cm. longis. *Spathae* primariæ tubulosæ, aculeolatæ, apicem versus sæpe fissæ, apice oblique truncatæ; secundariæ tubulosæ, oblique truncatæ, inermes vel aculeis rudimentaribus: *Spathellae* truncatæ, glabræ. *Involucrophorum* sessile; *involucrum* cupuliforme. *Perianthium* distincte pedicelliforme, apicem versus contractum, demum dilatatum et lobulatum; calyx corollæ æquilongus. *Fructus* nondum

plane maturus, ellipticus, cum rostro 0.2-0.3 cm. longo et caudiculo 0.1-0.15 cm. longo, 1.5-1.8 cm. altus, circ. 0.8 cm. in diam., utrinque contractus. *Squamae* in vivo flavidae, in sicco badiæ, concolores (margine haud diversæ), in seriebus verticalibus 15-17 dispositæ. *Semen* ambitu ovoideo-ellipticum, utrinque rotundatum, 0.8-0.9 cm. longum, 0.6 cm. latum, 0.4-0.5 cm. crassum, fovea chalazali in dimidio latere impressum, in altero latere dense rugulosum. *Albumen* profunde ruminatum. *Embryo* basilaris.

Planta mascula ut fœminea, sed spiculis brevioribus, floribus magis approximatis, calyce quam corolla 0.4 cm. longa duplo minore, perianthio infra apicem non contracto differt.

BRITISH NORTH BORNEO: Kinabalu Mts. at *Tenompok*, alt. circ. 4,500 feet, female, abundant (legit Furtado, comm. Clemens sub. no. 28650. Type in Singapore); *ibid*, male plant (leg. Furtado, comm. Clemens sub no. 28844); *ibid*, alt. 5,000 feet Clemens, n. 28566 (bis) female spadix only, leaves of a different plant); *ibid* (Clemens no. 28375, female).

This species belongs to *Group IX* of Beccari and in certain respects approaches very near to *C. diepenhorstii* and *C. marginatus* Mart. From *C. Diepenhorstii*, *C. rostratus* differs by its longer spines on sheath and ochrea, the leaflets being more approximate, the terminal pair of the leaflets being somewhat united at base (and not free), perianth more pedicelliform, fruit scales being not (or obscurely) bicolorous and the seed not globular. From *C. marginatus* it differs in the longer spines on the sheath and ochrea, larger and rostrate fruits, reddish brown, concolorous (or obscurely bicolorous) scales and in its distinctly ruminate seeds. Owing to its indistinct ruminations Beccari was inclined to put *C. marginatus* in *Group V* rather than in *Group IX*, but in the absence of better developed seeds, I find it better to retain *C. marginatus* in *Group IX*. The bases of the primary branches of the spadix of *C. rostratus* are also included for a greater part in the upper part (often split) of the spathe. Similar arrangement has not been observed in the two above mentioned *Calami*. In the living state the petiole and leaf rhachis are coloured golden yellow. The stem is not used by the Dusuns for tying purposes.

16. Calamus stramineus Furtado spec. nov.

Caudex scandens, circ. 7 cm. longus. Frondis *vagina*, ochrea et petiolus ignoti. *Frondes* magnæ ut videtur, cirrhiferæ, secus rhacheos dorsum unguibus armatæ. *Segmenta* ad 2 aggregata, gregibus oppositis vel fere

alternis, inæquidistantibus, lanceolata vel oblanceolata, utrinque attenuata, apice acuminata, basi acuta, 25-35 cm. longa, 4-5 cm. lata, 5-9-costulata, secus leviter plicata, costis et nervulis transversis utrinque sat distinctis, glabra, in margine spinulosa, supra viridia, subtus fere glauca. *Spadix foemineus* longus, flagelliformis ut videtur. *Spathae primariae* partim visæ, tubulosæ; secundariæ tubulosæ, truncatæ, glabræ, decidue furfuraceæ. *Spathellae* spathis secundariis similes, sed minores, apice plerumque ciliolatæ. *Rami primarii* circ. 30 cm. longi, in apicem sterilem, 2 cm. longum exeuntes, utrinsecus spiculis circ. 8. *Spiculae* 4-7 cm. longæ, sessiles, utrinsecus fructus 6-13 gerentes. *Involucrophorum* sessile vel subpedicelliforme. *Involucrum* cupuliforme. *Perianthium* fructiferum pedicelliforme, calyce corollæ æquilongo. *Fructus* elliptico-ovatus, utrinque rotundatus, summo abrupte rostratus, cum caudiculo 0.15 cm. et rostro 0.3 cm. longo 1.8 cm. altus, 1 cm. in diam. *Squamae* stramineæ, secus marginem subconcolores, dorso canaliculatæ in orthostichis 15 dispositæ. *Semen* ovatum, 1 cm. longum, 0.6 cm. in diam., fere cylindricum, utrinque rotundatum, rhaphen secus prominens, ceterum irregulariter alveolatum vel rugosum. *Albumen* profunde ruminatum. *Embryo* lateralis, proxime basin situs.

BRITISH NORTH BORNEO: Kinabalu Mts. near *Dallas*, alt. circ. 3,000 feet (Clemens no. 27010. Type in Singapore) *ibid* (Clemens n. 26496).

Evidently belongs to the *Group XIII of* Beccari and appears to be very near to *C. spathulathus* and *C. palembanicus*, but both these have seeds with homogeneous albumen. *C. Scipionum* has seeds with slight intrusions of the integuments in the albumen, but the leaflets here are equidistant (not arranged in groups). *C. densiflorus* bears distinctly ruminate seeds, but it has very narrow, linear, equidistant leaflets.

var. megalospermus Furtado var nov. A forma typica recedit spadicibus robustioribus, fructibus majoribus, squamis in orthostichis 17-18 dispositis, semine in latere foveali sat applanato.

BRITISH NORTH BORNEO: Kinabalu Mts., near Dallas, alt. circ. 3,000 feet (Clemens no. 27009. Type in Singapore).

The leaves in this specimen are apparently from very young shoots or plants and bear no thorns on the rhachis. The leaflets which are arranged in groups of 1-4 are papery in texture, narrower than in the type, green, concolorous, oblanceolate suddenly narrowed into a long acuminate apex, 3-5 costulate, spinulose along the costæ above and along the margins. In the duplicate preserved in the Berlin herbarium and bearing this number there is no trace of any

cirrus on the leaf, but the Singapore specimen which has somewhat older leaflets bears a very thin, filiform hooked prolongation at the apex. The lowermost spathe (secondary spathe) of the partial inflorescence in the type specimen bears also stout recurved spines, a fact which makes me surmise that the spadix in this species is flagelliform.

17. Calamus tenompokensis Furtado spec. nov.

Caudex scandens vel semiscandens, circ. 5 m. longus, sine vagina circ. 1 cm. in diam. Frondis *vagina* flagello carens (semper?), sensum in petiolum transiens, in parte superiore ventrali longitudinem secus breviter aperta, aculeis plus minus in seriebus transversalibus dispositis, valde applanatis, tenuibus, patentibus, cinnamomeis ad 2 cm. longis armata, decidue ferrugineofurfuracea. *Ochrea* brevissima, aculeis rigidis armata, in speciminibus junioribus lobis papyraceis caducis, 8-10 cm. longis ornata. *Frondes* cirrho carentes, cum petiolo 1-1.50 m. longæ, utrinsecus segmentis 6-9. *Petiolus* circ. 80 cm. longus, subtus convexus, aculeis robustis, solitariis vel confluentibus, patentibus vel reflexis, dispersis armatus, supra glaber, paulo concavus; *rhachis* aculeis solitariis, rarissime confluentibus, recurvatis subtus armata, circ. 50-70 cm. longa. *Segmenta* distantia, circ. 30 cm. longa, 4.5-5 cm. lata, inferiora alternantia, robuste-papyracea, lato-lanceolata, maxima latitudine in dimidia vel supra sita, basi attenuata, plicata, apicem versus subito vel potius sat subito acuminata, ad margines parce spinulosa, utrinque glabra, 5-7-stulata, nervulis transversis distinctis; terminalia ad 2/3 confluentia, sequentia ambo opposita vel sub-opposita, jugo terminalio valde approximata. *Spadix foemineus* fronde minor, apice sæpe flagelliformis, ramis secundariis patentibus, fructiferis 5-7 cm. longis. *Spathae* primariæ basin versus spinulosæ, in parte basilare tubulosæ, ad ramorum basin in lobos liberos exeuntes, longitudinem secus irregulariter fissæ, primariæ et secundariæ decidue ferrugineo-furfuraceæ. *Rami primarii et secundarii* ad spatharum orificium orientes. *Spathelae* truncatæ, furfuraceæ. *Involucrophorum* sessile; involucrum calyculiforme. *Perianthium* explanatum, calyx quam corolla duplo vel subduplo brevior. *Fructus* ovoideus vel ellipsoideus utrinque rotundatus, apice in rostrellum 0.2 cm. longum abrupte productus, sine rostrello circ. 0.9 cm. longus, 0.7-0.8 cm. in diam. *Squamae* stramineæ, apice fuscæ, seriebus 18-21 verticalibus imbricatæ. *Semen* ambitum ellipsoideum, utrinque rotundatum, fovea chalazali laterali, nonnihil lateque impressum, ceterum applanatum, superficie sulcis latiusculis a fovea radiantibus pertensa, 0.7 cm. longum, 0.5 cm. latum, 0.4 cm. crassum. *Albumen* æquabile. *Embryo* in latere opposito proxime basin situs.

Planta mascula in frondibus ut fœminea. *Spadix* circ. 75 cm. longus, ramis primariis 5-7. *Spathae* et spathellæ ut fœmineæ. *Spiculae* graciles, circ. 4.5-6 cm. longæ, utrinsecus floribus circ. 15-20, distichis, alternantibus, valde approximatis. *Involucrophorum* sessile. *Calyx* tubulosus, trifidus, quam corolla 0.4 cm. longa subtriplo brevior.

BRITISH NORTH BORNEO: Kinabalu Mts: at *Tenompok,* towards Lumu Lumu, alt. circ. 5,500 feet (legit Furtado, comm. Clemens sub. no. 28408, female plant. Type in Singapore). *Ibid,* alt. circ. 4,500 feet (leg. Furtado, comm. Clemens sub. no. 29203, Male). *Ibid* towards Dallas, alt. circ. 4,000 feet (Clemens, no. 27339, male); *ibid,* alt. circ. 5,000 feet (Clemens, no. 27899, male).

This species belongs to Beccari's *Group VI* and is closely related to *C. myriacanthus* Becc which, however, has free apical leaflets, rusty scales on its petiole, rachis, and spathe and only rudimentary thorns or none at all on the spadices. The male spikelets in *C. myriacanthus* are also very much shorter. *C. ramosissimus* Griff. also bears some resemblance to *C. tenompokensis,* but the former is distinguished from the latter by its more numerous, leaflets, and by its leaves terminating into 3 (not 4) leaflets which are, moreover, always free to the base, whereas the two terminal leaflets in the other species are always connate.

INDEX TO THE COLLECTORS' NUMBERS

The Roman number following a collector's number indicates the species bearing that number in this paper. Thus "Clemens 26,496-XVI" means that the specimen bearing Clemens no. 26,496 is quoted under *Calamus stramineus.*

BURKILL—s.n. (from Pulau Tioman)—II.
BURKILL AND HANIFF—13,446-VI; 13,451-VI.
BURKILL AND HOLTTUM—8,807-XI.
CLEMENS—26,496-XVI; 27,009-XVI var; 27,010-XVI; 27,339- and 27,899-XVII; 28,375-XV; 28,408-XVII; 28,566-XV; 28,650-XV; 28,844-XV; 29,195-VIII; 29,198 and 29,198a-IV; 29,203-XVII.
HANIFF—14,252-VI; 15,910-X; (Langkawi) s.n.-X.
HENDERSON—18,465-II.
HOLTTUM—10,974-XI; 15,211-II.
KJELLBERG—2,367-IX; 2,398-VII; 2,649-I.
MOORHOUSE—(from Kuala Pilah) s.n.- XI and XII.
NUR—11,130 and 12,188-XI.
RAMOS—1,400 and 1,788-XIV.
RIDLEY—(from Matang) s.n.-III; 9,207- and 9,814-XI; 11,215-V; 11,987-XI; 12,118-XII; 13,921-VI.

A NEW RHODODENDRON FROM GUNONG TAHAN

By Dr. J. J. Smith

Rhododendron Seimundii J. J. S., sp. nov.

Frutex innovationibus c. 6-0.7 cm. longis, ramulis teretibus, dense brevissime puberulis. *Folia* 5-10 in innovationum parte superiore alterna, remota, parva, breviter petiolata, oblongo-obovata vel elliptica, interdum fere lanceolata, apice rotundata vel obtusa, sæpe distincte crasse apiculata, basi angustata acutiuscula vel acuta, sicco margine recurva crenulata, adulta supra glabra rugulosaque, subtus sparse lepidota plus minusve glabrescentia, deinde subtus et etiam supra præsertim versus basin impresse punctata, scrobiculis margine leviter elevatis, supra in utraque parte costæ mediæ supra sulcatæ subtus bene obtuse prominentis convexa, nervis lateralibus obsoletis, crasse coriacea, supra nitide nigro-fusca, subtus atrofusca, c. 1.25-2.8 cm. longa, 0.475-1.1 cm. lata; petiolus subteres, supra applanatus, dense minutissime puberulus lepidotusque, c. 0.2-0.4 cm. longus. Gemmæ floriferæ terminales, ovoideæ, c. 0.8-0.85 cm. longæ, ramentis exterioribus ovatis, obtusis, dorso dense pubescentibus lepidotisque, ciliolatis. *Flores* 2-4, pedicellati, pedicello cum ovario angulum obtusum faciente, tereti, sparse lepidoto, 0.9-1.2 cm. longo. *Calyx* obliquus inæqualiter 5-lobus, lepidotus. *Corolla* infundibuliformis, 5-fida, extus loborum margine lato glabro excepto sparse lepidota, intus glabra, secta et explanata flabelliformis, c. 1.9 cm. longa, limbo 2.6 cm. lato, tubo c. 0.8 cm. longo, basi 0.8 cm., apice 1.6 cm. lato, lobis obovatis, ut videtur interdum subretusis, c. 0.9-1 cm. longis, 0.6-0.7 cm. latis. *Stamina* 10, c. 1.8 cm. longa; filamentum lineare, glabrum; anthera supra basin dorsifixa, oblonga, basi obtusa, poris 2 oblique introrsis hians, c. 0.175 cm. longa. *Ovarium* breviter ovoideo-conicum, obtusum, valde 5-angulato-canaliculatum, dense lepidotum, c. 0.225 cm. longum, 0.2 cm. diam.; stylus impositus, filiformis, basi lepidota excepta glaber, cum stigmate capitato 5-lobulato 1.7 cm. longus. *Discus* annularis, 10-lobulatus, glaber, 0.2 cm. diam.

MALAY PENINSULA: Pahang, Gunong Tahan, 5,500 ft. (E. Seimund, Nos. 159, 175, 343, 893, February—March, 1921).

Amongst the *Rhododendron* material which the Director of Gardens, Straits Settlements, very kindly sent me on loan for study, I found, partly under *R. spathulatum* Ridl., partly under *R. elegans* Ridl., specimens of the new species described above.

From the two species mentioned and also from *R. calocodon* Ridl. it is, apart from other characteristics, at once to be distinguished by the corolla, which is cleft to the middle in *R. Seimundii,* whereas in the others the lobes are much shorter than the tube.

Of the remaining Peninsular species with small leaves, *viz. R. Scortechinii,* King et Gamble, *R. pauciflorum,* King et Gamble and *R. perakense,* Ridl., I have seen no material. According to the descriptions, however, *R. Seimundii* is distinct from *R. Scortechinii* in the puberulous twigs, smaller leaves with obsolete nerves and fewer-flowered umbels, from *R. pauciflorum* in the puberulous twigs and petioles, not retuse leaves, more flowered inflorescences, lepidote pedicels, and from *R. perakense* in the puberulous not scaly twigs, narrower leaves with obsolete lateral nerves, larger flowers and a densely lepidote ovary.

Description from herbarium material.

PUBLICATIONS OF THE BOTANIC GARDENS, SINGAPORE

1. **The Agricultural Bulletin of the Malay Peninsula** [Old Series] nos. 1-9, 1891-1900 (out of print).

2. **The Agricultural Bulletin of the Straits and F.M.S.** [Second Series, monthly issues] Vols. 1-10, 1901-1911. Most numbers are available, price 50 cents each or $5 per volume.

3. **The Gardens Bulletin, Straits Settlements.**

   Vol. 1 nos. 1-5, January to May 1912 (as *Agricultural Bulletin of the Straits and F.M.S., Third Series*). nos. 6-12, December 1913—March 1917 (as *The Gardens Bulletin, S.S.*).

   Vol. 2 nos. 1-12, July 1918—August 1921.

   Vol. 3 nos. 1-12, August 1923—March 1925

   Vol. 4 nos. 1-12, June 1926—January 1929.

   Vol. 5 nos. 1-12, August 1929—June 1932.

   Vol. 6 nos. 1-15, (issued as parts 1-3) December 1929—October 1930.

   Vol. 7 parts 1-3, September 1932—June 1934.

   Vol. 8 part 1, October 10th 1934.

   part 2, January 26th 1935.

The above former issues of the Gardens Bulletin may be purchased from the Botanic Gardens, Singapore, at $5 per volume or 50 cents per number for vols. 1-5 (Vol. 6, of 15 numbers, $7.50); in some cases two or more numbers were published together. Vols. 7 and 8 are published at $8 per volume; the prices of parts vary according to their size. The parts are published at irregular intervals, as material is available.

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